ILLUSTRATED
ELECTRICAL REVIEW
A Journal of Scientific and Electrical Progress.

VOL. 29. No. 4. WEEKLY. | NEW YORK, WEDNESDAY, JULY 22, 1896. | $3 PER ANNUM. Single Copies, 10 Cents.

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Entered at Post Office, New York, as Mail Matter of the Second Class.

VIEWS, NEWS AND INTERVIEWS.

The late Archduke Charles Louis, of Austria, was the patron of the Vienna Electrical Engineering Society.

What is there in the air of Chicago that makes some members of the electrical fraternity so pugilistic? A year or so ago one of the shining lights had the humiliation of being thoroughly whipped by a delegation who called on him for the purpose at his office in the Old Colony building. Now we learn of a former district manager who failed to swallow his language at the proper time, and was consequently kicked out of doors from one of the park departments.

The British War Office is reported to have sent two sets of X-ray apparatus up the Nile, to be used by the army surgeons in determining the extent of bone fractures and in locating bullets in wounded soldiers.

Sir Isaac Newton, like many other men of genius, was a victim of absent-mindedness. It is related that, on one occasion, his friend, Dr. Stukeley, being announced, Sir Isaac asked him to be seated and he would join him shortly. The philosopher repaired to his laboratory, and as time went on, it became evident that the visit of his friend had entirely escaped him. The Doctor was left sitting in the dining-room until the dinner was served. This consisted of a roast fowl. The host not even now putting in an appearance, Dr. Stukeley seated himself at the table and demolished the fowl. When Sir Isaac entered the room and saw the remnants of the meal, he apologized, and said: "Believe me, I had quite forgotten I had dined."

It is reported that a German submarine cable company has been formed to lay a cable from Germany to Spain and thence to the United States.

According to a recent report made by the New York State Railroad Commission, 94 per cent of the street railways of the State are operated by electricity.

The New Telephone Exchange at Worcester, Mass.

In the ELECTRICAL REVIEW for July 8, 1896, a new telephone exchange and switchboard installed by the New England Telephone and Telegraph Company, at Worcester, Mass., was described. The accompanying illustration is a view of the main switchboard in this new exchange. The round, white spots immediately in front of the operators

SWITCHBOARD IN THE NEW ENGLAND TELEPHONE AND TELEGRAPH COMPANY'S NEW TELEPHONE EXCHANGE AT WORCESTER, MASS.

are the lamp signals. The exchange is also equipped with a toll-line board furnished with lamp signals and all other modern devices for handling long-line service. There is also a power switchboard which regulates the current for handling the signals on the telephone switchboard.

The switchboard, shown in the illustration, is the first multiple board ever constructed employing automatic signals. It is without doubt the most rapidly operating board ever built. The system of signals is especially ingenious, affording the operator constant knowledge of the several connections under her charge.

This exchange is supplied with 60 large cells of storage battery, which furnish current for the lamp signals. They are kept charged by dynamos operated by either a gas engine or an electric motor. The new switchboard and apparatus connected with it are based chiefly upon the inventions of Mr. C. E. Scribner and other well known experts of the Western Electric Company. Mr. I. H. Farnham, the electrical engineer of the New England Telephone and Telegraph Company, is largely responsible for the convenience and satisfactory working of this new board.

Siemens & Halske Bring a Big Damage Suit.

As a result of the large fire in the lumber district of Chicago, which took place August 1, 1894, three damage suits for large amounts have been filed in the Circuit Court against the Chicago, Burlington & Quincy Railroad. It is alleged that the fire was attributable to a spark emitted from an engine belonging to the defendant company. One of the three suits was brought by the Siemens & Halske Electric Company, of America, whose plant was destroyed in the fire. This company's damages are placed at $465,000.

Extensive improvements in the telephone system at Pittsfield, Mass., have recently been made.

NORTHWESTERN ELECTRICAL ASSOCIATION.

FOURTH SEMI-ANNUAL CONVENTION HELD AT MARINETTE, WIS., JULY 15, 16 AND 17—THE PRESIDENT'S ADDRESS—THE ATTENDANCE—ABSTRACT OF THE PROCEEDINGS.

At 9 A. M. Wednesday, July 15, 1896, President W. B. Baker, of Waupaca, Wis., called to order, in the court house at Marinette, Wis., the fourth semi-annual meeting of the Northwestern Electrical Association. After roll call by the secretary, the reading of the minutes of the last convention was waived and the minutes, as printed, were approved. The president's address was then read as follows:

While the president is hardly expected to make an address at the semi-annual convention, yet I will endeavor to cover a few points which, in my opinion, should receive attention at this meeting.

The benefits derived from the semi-annual convention of central station managers, as well as supply men working under nearly the same conditions, have been felt by all who have attended, and we shall soon be a power that will be felt beyond our limits.

A gentleman recently remarked to me that while the Northwestern Electrical Association could learn from the National Association, on the other hand there were many things that our little association could teach our superior, and this certainly is gratifying to us all.

The first work accomplished by us as an association was that of the Legislative Committee in 1895. I need not go into detail, for you all know the result. There is a matter in this connection, however, that needs attention. The expenses of this committee were $348.01, and as there has been no provision made for defraying such expenses, the parties who did most of this work and furnished all of the money have not yet been paid. At the last meeting an attempt was made to settle this matter, but it seems there was a misunderstanding, and it has resulted in nothing being done. Our secretary tells me that of 83 central stations in this State, only 24 have responded to the call made upon them, as instructed at the last meeting. Circulars were sent to each central station explaining the nature of the call. I trust the Ways and Means Committee is prepared to make

recommendations for meeting such emergencies, for we shall have more of them, and that the association will act upon the question before its adjournment. With some one the responsibility should rest to instruct the Legislative Committee to incur such expenses as are actually necessary, and that the same be borne by the association. This matter is important. I feel a little delicate in referring to it, being interested with Mr. Lord in business, and Mr. Lord being the principal creditor, and he has been out of pocket for money that he has advanced to the association, as well as for his time that he put in at Madison. I trust that there will be no further delay in settling this matter.

Within the past month I have received two letters from gentlemen in different parts of the State asking if the association cannot come to their rescue. In both cases their business was threatened, and knowing the purposes of our association, although not members, they came to us for assistance. There being no provision in our by-laws authorizing the officers to take action, I was obliged to write them that, however much we regretted their situation, we were powerless to act. I was intending to ask our secretary to read these letters at this meeting, but, through carelessness on my part, I left the letters at home, and I can only explain their nature. Since coming to the association it has been thought best not to bring up one case. The other case I will explain to you, and although I have no recommendation to make, because we cannot clearly see our way, I bring it before you as an idea which may lead to something that hitherto has not come up. The situation was this: In one of our cities the only lighting plant in the place was furnishing street lights to the city; the city desired to operate its own plant, but not being in a position where it could bond itself for building the plant, it made arrangements, or was attempting to make arrangements, with parties to build a plant and bond it, and float the bonds and turn the plant over to the city at a nominal figure of one dollar, subject to the bonds. These parties wrote to us to see if the association could in any manner help them to prevent the municipal ownership. As I stated, I have no recommendation to make, but here is a call that has been made upon us, and as we are banded together for the purpose of helping each other, the matter should come before the meeting. If there are any recommendations or any suggestions that any of the members desire to make for helping a member in trouble of this kind, we should like to hear them.

Another suggestion that I would make is that the secretary keep a record, as far as possible, of the rates charged in each city within our limits, so that whenever a member desires information regarding rates in other places, he has only to write our secretary and obtain the necessary statistics. A specially prepared record book can be made that will simplify the work after the information has once been gathered. Being the president, I have been the mark for central stations to fire at, and have had many letters asking for such information, and have been obliged to reply without giving them satisfaction.

We have a committee called the underwriters' or insurance committee. Its duties were never clearly defined, consequently no action has ever been taken by this body. To me this seems like an important committee. Possibly, if clearer relationship existed between the electric light and the insurance companies, it would work beneficially to both parties. Mr. Pierce, of Chicago, kindly consented to meet us to-day, but I am informed that he could not be here, but sent a paper which will be read by our secretary. It is on this question from the insurance standpoint. Mr. C. C. Paige, chairman of the committee, will take our side of the question. I trust this will be of interest to all, and will lead to good results. I think there is a field for work here. In some of our smaller cities the insurance companies have recently been investigated, and while in all cities there is a large amount of poor wiring which, for the benefit of the plants themselves, should be changed, still, in some cases, your insurance companies are obliging us to do work that is burdensome to the electric light companies, in a measure, if not permanently. It does for the present cripple their business on account of the extra expense they are put to, which comes out of the consumer, and owing to the hard times, instead of taking the lights to-day, he will put it off for an indefinite period. As I said, if a closer relationship existed between the electric light and insurance companies, I believe it would work beneficially to both parties.

I have nothing further to say this morning, and after listening to the reports of the officers and committees, we will proceed to the reading of papers.

Before going further, I have been requested to announce that the damage to the electric light plant here will not interfere with any pleasures that have been mapped out for us. I wish to state for the association that we regret very much this disaster, and I can assure Mr. Higgins and the other gentlemen connected with the plant that they have our full sympathy, for we have, most of us, been in exactly the same position ourselves.

The secretary and treasurer's report was then read. The president explained that an item of $100 for a trip to New York city was to pay the expenses of the secretary of the association, Mr. Mercein, who attended the convention of the National Electric Light Association and the Electrical Show, with the object of making a report on both to the Northwestern Electrical Association. Mr. Doherty thought there were several items in the report which deserved consideration. He also made a motion that the Chair appoint a committee to consider the points brought out in the president's address, the committee to report at a future session of the convention, the time to be fixed by the president. The motion was seconded and carried. Mr. Hanley made a motion, which was carried, that the secretary's report be referred to the Ways and Means Committee, with the request that they suggest a means of reducing the indebtedness of the association for special work.

Mr. Lord, of the Legislative Committee, reported progress. Mr. De Land, of the Programme Committee, reported that papers would be read as follows:

Rights of Electrical Companies, by W. Clyde Jones, of Chicago.

The Insurance of Electrical Plants, by R. H. Pierce, of Chicago.

Insurance, by C. C. Paige, of Oshkosh, and discussion on that subject by Wm. H. Merrill, of Chicago.

The New York Convention and Exposition, by Thos. R. Mercein, of Milwaukee.

Alternating-Current Motors, by Prof. D. C. Jackson, of Madison.

Lightning Arresters, by W. R. Garton, of Chicago.

Mr. Paige, chairman, reported that there had been no meetings of the Insurance Committee. He said he had prepared a short paper which he would read at the proper time, and that it would contain certain recommendations. Mr. Hanley said the programme would show what the Entertainment Committee had provided. The freedom of the street cars at Marinette and Menominee had been given to the delegates, and the freedom of the city was extended by the Mayor. The Committee on Reclassification of Membership reported that it was not ready to present a formal report, and the Auditing Committee presented no report. The secretary stated that the books had been properly kept. Mr. Mercein presented the following resolutions on the death of Messrs. Hall, Gunderson, and Sullivan. On motion, the resolutions were unanimously accepted and adopted:

Whereas, It has pleased an all-wise Providence to remove from the scene of their usefulness three of our most valued members—Mr. Hall, Mr. Gunderson, and Mr. Sullivan.

Resolved, That as time goes on, this association has only learned to more fully realize its loss, and so far from forgetting it, the more earnestly deplores the dispensation which has deprived it of the guidance and companionship which so cheered and stimulated its councils.

Resolved, That the names of our comrades, although stricken from the rolls of the living, are deeply engraved on our grateful memories, and that our sympathies are hereby tendered to their bereaved families, and the secretary is instructed to forward to each a copy of these resolutions.

Mr. Mercein reported that during his trip to New York he secured five or six new members. The following applications for membership had been presented:

Henry L. Doherty, general manager Madison Gas and Electric Company, Madison, Wisconsin, recommended by A. C. Bunce and E. G. Mullen.

H. M. Kellogg, superintendent Municipal Plant, Adrian, Minnesota, recommended by W. E. Baker and Thomas R. Mercein.

Foree Bain, consulting engineer, Chicago, recommended by Thomas R. Mercein and James Wolff.

G. E. Fish, Little Rock, Arkansas, recommended by Thomas R. Mercein and James Wolff.

G. M. Sanborn, occupation, electrical contractor, Indianapolis, Ind.; recommended by Thomas R. Mercein and James Wolff.

S. E. Christie, traveling salesman Dearborn Drug and Chemical Works, Chicago; residence, Racine, Wis.; recommended by Thomas R. Mercein.

C. E. Van Bergen, secretary Hartman General Electric Company, Duluth, Minn., recommended by W. B. Baker and Irving P. Lord.

Mr. A. A. Cross, general manager Superior Light and Power Company, West Superior, recommended by Thomas R. Mercein.

Mr. R. J. Randolph, Excelsior Electric Company, Chicago, Ill., recommended by Thomas R. Mercein and James Wolff.

On motion, the secretary was instructed to cast a ballot for the election of the above-named gentlemen. The paper by Mr. W. Clyde Jones on "Rights of Electrical Companies" was read in his absence by Secretary Mercein. Mr. R. H. Pierce's paper on "Insurance of Electrical Companies" was read in his absence by Mr. Cutter.

Mr. A. C. Merryman, president of the Marinette Electric Light and Street Railway Company, was then introduced to the association and spoke as follows:

"I should like to ask of this association a single question, so as to get some information about the feasibility of transmitting power from our different water powers up the river, to use that power here. I looked the matter up several years ago, but it was deemed then that the cost of bringing the power here was too great. The water power is very extensive, and we would like to use it at Marinette, if it can be possibly employed; the distance of Marinette from the source of power is from three to 50 miles. I suppose some or all of you gentlemen can tell us readily whether it be practicable to generate the power up the river and bring it here for use."

Mr. Beggs was called upon by the president to express his opinion, which was to the effect that he considered the matter of sufficient importance to employ an engineer to determine whether or not the required investment of capital would be warranted.

Mr. Hanley explained that Mr. Merryman's idea was not in reference to using the water power for electrical purposes. The point he wished to make was whether or not it was practicable to bring the power to Marinette instead of having it utilized at the different points along the river. Instead of the manufacturing plants being scattered as now, it was expected that they would concentrate in Marinette. Mr. Beggs thought that this would not be practicable.

The president stated that the supply men had an exhibition of electrical apparatus and supplies in the adjoining room, and suggested that the delegates make a careful inspection of the exhibition. The following committee was appointed by the chair to consider the recommendations in the president's address: Messrs. Doherty, Kountz, and Paige.

The president then spoke of the desirability of collecting central station statistics in the territory from which the association drew its membership. Mr. De Land referred to the work compiled by Mr. W. J. Buckley, entitled "Electric Lighting Plants," which contained many valuable statistics. Mr. De Land also spoke of the difficulty of securing information of this character from central stations, and said that he had received many valuable facts from city clerks. After further extended discussion of this matter, the meeting adjourned until the following day.

THURSDAY, JULY 16.

The Thursday morning session was called to order by the President, W. B. Baker. The following new mem-

bers were elected: Elihu Colman, president of the Fond Du Lac Electric Company, Fond Du Lac, Wis.; Frank Kellogg, superintending engineer of the Spencer Electric Company, Spencer, Iowa, and Casper Faust, owner of the Faust Electric Company, Rhinelander, Wis. At the request of Mr. Hanley, the applications of John F. Hancock and Francis A. Brown were acted upon in their absence, and both gentlemen were elected to membership. Mr. Hanley referred to the large amount of unpaid dues, and suggested that the by-laws of the association be amended so that, in case of non-payment of dues for one year, a member could be expelled. Mr. Doherty, chairman of the committee appointed to consider the president's address, asked for an extension of time until Friday morning, in order to make his report. Mr. Hanley requested every member of the association to stay to the banquet, as it promised to be a very interesting occasion.

Mr. Mercein then read his paper on the "New York Convention and Exposition," which was received with applause. Mr. Cutter read a paper on "Alternating-Current Motors," by Prof. D. C. Jackson, of Madison, Wis. The president then called upon Mr. Beggs for remarks in relation to Mr. Mercein's paper. Mr. Beggs stated that his interest was taken from the standpoint, first, of conscientious duty to himself and to those whose capital he had under his management, and, secondly, from the standpoint of an investor in electric lighting plants in all parts of the country. "I care not for the National Electric Light Association, that it simply exists to make a fat position for one man—I have made that charge before and I can repeat it." Mr. Beggs said that Mr. Mercein's report was a very truthful one, and that he had grouped a few of the results of the National Electric Light Association's meeting so clearly that his present hearers had as good an idea of what was done as if they had been present. Mr. Beggs made further extended remarks in his usual well known vein.

Mr. Colman stated that he had only been a member of the association for a few minutes and perhaps should keep still, but he wanted to say that he had already got his money's worth. He stated that he would be very glad to let the association have the use of any statistics that he had compiled.

Mr. W. R. Garton's paper on "Lightning Arresters" was then read.

The president invited Mr. Buckley to address the convention on the question of a two and one-half-watt lamp. Mr. Buckley stated that every lamp manufacturer with whom he had spoken, insisted that such a lamp could not be made. He said it was a question as to whether central station men would use lamps on which the manufacturer made a considerable profit, or whether the manufacturer would have to increase his investment and make a lamp on which the central station men could make a profit.

Secretary Mercein then read the following report of the Ways and Means Committee:

"The Committee of Ways and Means report that we recommend that Section 3 of Article 7 of the by-laws, which provides that no member shall be dropped for delinquency in paying dues inside of two years, be so amended that the term be changed to one year, and that the secretary be formally instructed to draw upon all delinquents who are six months in arrears.

"The committee also recommend that the president and directors of the association be authorized to incur what, in their judgment, is a necessary expense for the furtherance of the needs of this association, referring to expenses which the legislative committee will probably be required to incur.

"The committee see no better method of accomplishing the payment of the special indebtedness to Mr. Lord and Mr. Schuett, to which reference has heretofore been made. I would say, however, that the question of the payment of the indebtedness to Mr. Lord has been considered in the secretary's report, which has been adopted. There is no deficit in the treasury, and the association is in perfectly good financial condition, but it will be necessary to postpone the payment of this special indebtedness for some little time, and Mr. Lord is perfectly willing to accept the suggestion of the secretary's report, which has been adopted."

The secretary said that the net amount of the debt referred to was about $248, and that the total amount in the treasury was $165.81. After considerable discussion as to the best method of liquidating the debt, it was decided to take up a subscription among the delegates present. The subscriptions collected amounted to $125. On motion of Mr. Hanley, the secretary was instructed to send a circular to all of the central stations in the State, stating what had been done, and asking them to make sufficient contributions to cover the balance of the unpaid debt. The motion was seconded and unanimously carried. The meeting was then adjourned to 2 o'clock P. M. for the same day and place.

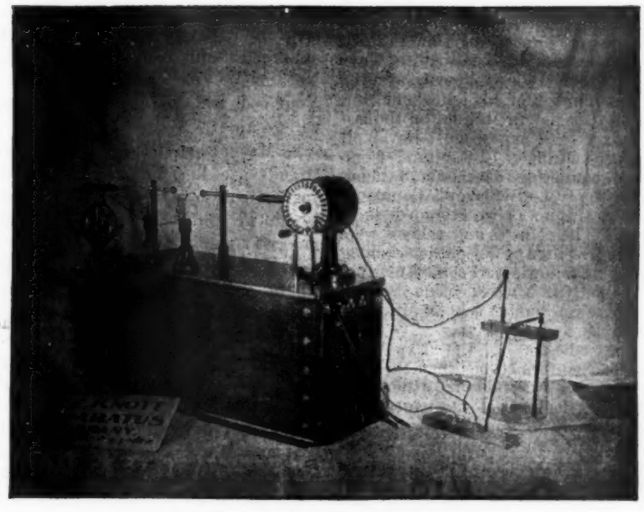
The first business of the afternoon

(Continued on page 43.)

New Tesla Coil for X-Ray Work.

During the last few months the subject of exciting Crookes tubes has received much attention from electricians and scientists in general. It is not surprising, therefore, that enterprising experimenters have placed upon the market various devices which they believe to be an improvement over the old methods of exciting these tubes. The difficulties in the way were not easy to surmount. First of all it was found there must be an exceedingly rapid discharge of the current through the tube. Second, this discharge must be of sufficiently high potential to make it vigorous. Third, the amperage must be so low as to produce little or no heat in the tube itself. This last point was a subject of great moment, as in one form of the tube where the cathode rays focus upon the glass itself it was found that if a large amount of current was used the glass became heated and the tube collapsed.

Many experiments have been performed showing the adaptability of the Holtz machine to this work. At present, however, no satisfactory device has been hit upon by which a Holtz machine can be made to give sufficiently rapid discharges combined with durability and readiness to work under all climatic conditions. Any one of these points seems to have been attained, but to our knowledge no similar machine has yet been able to meet them all.



A New Tesla Coil for X-Ray Work.

The induction coil seems to have been productive of better results in that it can be relied upon under all atmospheric conditions, and with proper care is not so liable to get out of order. The difficulty, however, of making a complete break of sufficient rapidity in the primary current, has rendered this apparatus of little practical value for hospital work. Furthermore, the problem of adjusting the ratio between the primary and secondary coil has not yet been settled, so that many of the induction coils placed upon the market have been found to be exceedingly destructive to the Crookes tubes. This deterioration of the tubes, when used on these coils, has been from overheating either the aluminum or platinum electrode. In either event the degree of vacuum would be changed, and hence the efficiency of the tube greatly interfered with.

The wonderful and startling results produced by Nikola Tesla during the early stages of this work lead many to believe that much was to be hoped for in the development of the form of apparatus used by him. A coil known as the modified Tesla coil has been placed upon the market by the L. E. Knott Apparatus Company, of 14 Ashburton Place, Boston, Mass. This coil contains many new features entirely different from anything before seen in the practical electrical field. They have employed a new form of transformer, which lifts the current from 52 to about 35,000 volts. The principle of this transformer does not differ materially from that of the induction coil, except the ratio of the core to the primary and secondary is so adjusted that the principle of the regular alternating current transformer applies. Also, by a new method of insulation, the secondary coil is so wound that each layer is surrounded by an oil of high insulating properties. A new feature also has been introduced in the condenser since not only the transformer and oscillator, but also the condenser itself, is immersed in oil. Great improvement has been made here in the condensing surface since the old method of using tinfoil has been discarded and a much more permanent copper plate substituted. By an arrangement of the primary of the transformer, also, either a 52 or 104-volt current can be used equally well. If the former, the machine will take six amperes. If the latter, about three. When working on the number of watts here indicated, a steady discharge of something over eight inches is obtained. The frequency is so high that striking Tesla effects are also produced. Many of the experiments that are so ably discussed in Tesla's little book can be shown with great satisfaction with the coil here described.

It is not thought that the problem of running a high-frequency coil on a direct current has ever before been successfully solved. Wonderfully successful work, it is said, has been done by this coil so excited.

The great improvement, however, on this coil is the mechanical spark gap which renders the discharge of the condenser absolutely uniform and the rapidity of the discharge under the control of the operator. As the manufacturers of these coils are in the physical and chemical apparatus business, and dealing with hospitals, it is but natural that they should endeavor to place a coil on the market which is especially adapted to this kind of work. We are pleased to know of their success and to know that the instruments have so far been developed that surgeons find them of great practical value. The manufacturers of these coils have recently issued an eight-page pamphlet on the use of the X rays, and are soon to issue a new edition containing their recent improvements. The amount of energy they have shown is surely commendable.

The Roar of Niagara.

The following official report on the roar of Niagara Falls at the recent Electrical Exposition in New York city has been made to Mr. E. J. Hall, general manager of the American Telephone and Telegraph Company, through whose courtesy and efficient engineering staff this interesting feature of the show was made possible:

NEW YORK, N. Y., June 13, 1896.

EDWARD J. HALL, ESQ., Vice-President and General Manager.

DEAR SIR: I beg to submit the following report on the exhibition of the "roar of Niagara" given at the Electrical Exposition at the Grand Central Palace, corner Forty-third street and Lexington avenue, New York city, from May 2, the opening day, to May 30, the closing day of the show.

For the transmission of the roar of Niagara Falls to New York city, there was set up at the Cave of the Winds, on the American side of the Falls, a solid-back transmitter, incased in a wooden box through which there protruded a horn four feet long and 18 inches at the mount, which was screwed into the transmitter. The circuit was energized by three cells of standard Fuller battery.

The circuit between the Cave of the Winds and the Exposition building in New York was made up as follows:

From the transmitter in the Cave of the Winds through 700 feet of two-conductor emergency cable, thence through 1,000 feet of twisted pair Okonite wire, then along a metallic circuit of No. 14 iron wire 1,500 feet long to the Niagara Falls exchange of the Bell Telephone Company, of Buffalo.

From the Niagara Falls exchange over the trunk wires of the Bell company to their central office in Buffalo, a distance of 22 miles, three miles of which consists of underground cable. From the Bell company's office to the test station of the American Telephone and Telegraph Company in Buffalo, a distance of 3.5 miles.

From this point the circuit was over the standard No. 8 B. W. G. copper metallic circuit route of the American Telephone and Telegraph Company to 18 Cortlandt street, New York city. This distance is 474.57 miles, 3.12 of which is in underground cable.

From 18 Cortlandt street the circuit passed through the underground system of the Metropolitan Telephone and Telegraph Company to their Thirty-eighth street exchange, a distance of 3.74 miles. From this point, by means of one mile of underground and aerial cable to the switchboard in the exhibit of the Metropolitan Telephone and Telegraph Company, at the Exposition building.

From this switchboard, by means of a twisted pair of wires, the circuit was led to a set of 20 police receivers placed in the center of the exhibition hall.

The total length of this circuit is 501.92 miles, of which 11.47 is in aerial or underground cable.

The receiving telephones were connected four in series, each group being connected in multiple with the others. These instruments were placed near a working model of Niagara Falls, about 12 feet long by four wide.

Service was given from 8 P. M. until 10.30 P. M., daily except Sundays, during the intervals when the exposition band was not playing. Later, during the last 10 days of the fair, owing to the urgent demand for an earlier exhibition of the roar of Niagara Falls, the service was given from 5 P. M. to 10.30 P. M.

There were about 150,000 visitors to the exposition, and it is estimated that not less than 100,000 listened to the roar of Niagara. From the date of the opening to the closing, fully 200 people were in line before the hour of connecting the circuit, the line being kept to about that number throughout the evening, and generally, when the connection was taken down, there were as many disappointed at not being able to listen. Frequent requests were made for the service outside of the regular exhibition hours, and, in many cases, parties visiting the exposition in the afternoon demanded the return of the cost of admission by reason of their not being able to hear the roar.

Service was frequently given outside of the exhibition hours during the afternoon and evening, and in some cases noted people were, by the courtesy of the representatives of the Metropolitan Telephone and Telegraph Company, allowed to listen from a booth in the exhibition pay station, among whom may be mentioned: Four Judges of the Supreme Court, Chauncey M. Depew, John Jacob Astor, the Russian Consul-General and Police Commissioner Andrews and Mrs. Andrews. In addition to the above-named parties, the following were entertained: Professor Bell, Thomas A. Edison, Sir Henry Irving, Seth Low, President, and several professors of Columbia College, Members of the Corean Embassy, a Spanish princess (a daughter of Don Carlos), a Commander in the Spanish Navy (who returned the following evening with a number of his fellow officers), and, by special invitation, on the last night of the exposition, De Wolf Hopper and his "El Capitan" Company, consisting of about 75 members; the "Lady Slavey" Company, of the Casino, also attended in a body. The colleges and schools were well represented by delegations, among them the following: Packer Institute of Brooklyn, Newark High School, and several public schools in New York city and Brooklyn.

The officials of the Exposition Company informed me that the roar of Niagara was one of the most attractive features of the exposition, and was given generally without a hitch. On one occasion, I understand, the service was interrupted for about half an hour, owing to some battery trouble; and on one or two occasions there was some slight local trouble which was quickly and easily remedied. A daily test of the receivers was made, and on an average, three or four instruments were found defective, chiefly owing to broken cords resulting from their being carelessly handled by the public.

Our exhibition was very satisfactory in every way, there being no complaints of disappointment so far as I could learn; and the remarks by those who had listened were very gratifying.

About 3 P. M. on May 9, Professor Bell listened to the roar, using receivers Nos. 48 and 154, which were immediately set aside by the officials of the Exposition Company and placed in the glass case inclosing the model of Niagara Falls. These receivers have been turned over to Mr. Pickernell.

A photograph of Professor Bell was taken at the time he was listening to the roar of Niagara at the model of Niagara Falls and River, a copy of which please find herewith. I also hand you herewith a picture of the apparatus used at the Falls, taken from the Buffalo *Express* of Sunday, May 10, 1896, and an illustration from the ELECTRICAL REVIEW of May 13, showing the location of the Niagara Falls model.

Very respectfully,

(Signed) C. R. TRUEX,
Special Agent.

Free Silver and Street Railway Employees.

[*From the Cincinnati Tribune.*]

Between 1,700 and 1,800 men are in the employ of the Cincinnati Street Railroad Company.

The payrolls of the company, for labor alone, amount to over $800,000 a year.

The weekly payroll alone is between $5,000 and $6,000, and the gripmen, the motormen and the conductors are paid every day. These latter receive for full time $2 per day and if they work overtime they are paid for it, even if the overtime be no more than 15 minutes.

We have made it our business lately to talk with a good many of these conductors. We have not found one who expressed himself as dissatisfied with his pay.

Now, we ask these 1,700 or 1,800 men whether they propose voting for free silver coinage. If any do, we want to call their attention to a few things.

1. If the opinion of the silver men is right, the inevitable effect of free coinage will be to raise prices. There is not a thing you eat, or drink, or smoke, or wear, or your wives or children eat and wear, but will go up. Not one. Your rents will go up. Your coal will go up. Everything will go up.

2. Maybe you think there will be an advance in wages. Let us call your attention to the special reasons which in your case are likely to prevent a rise in wages.

The street railroad company in whose employ you are, is about making a 50-year contract with the city, one of the conditions of which will be a five-cent fare, with transfer privileges. If this arrangement goes through, as we suppose it will, the maximum price the street railroad company can charge for the services it renders will be absolutely fixed for a period of 50 years—won't it? That's plain, isn't it?

But all the other expenses of the street car company will go up—just as yours are going up. All its supplies, its fuel, its wires, its rails, its cars—all these will advance. That is the very thing the silver men tell you will happen—and we think they speak truly.

Now, with increased expenses—the rates of fare remaining fixed—what chance is there, do you suppose, that the company will make any advance in wages?

You may say the company can cut down its dividends. But don't you see that the stockholders will grumble if their dividends cut down? They are getting now but five per cent. They are really getting less than that, because they have to pay 114 or 115 for their stock, and five per cent on par is not quite four and one-half per cent on 114.

Now, don't forget that the expenses of stockholders are also going to go up, and the dividends will not have the purchasing power under free silver they have now. So there would be an awful kick coming, if in these days to come of higher prices dividends were reduced. To reduce dividends when prices were going up, would be to stockholders just like cutting down your wages when prices were advancing.

But let us suppose that, after a number of you had thrown up your jobs because your wages were not sufficient to live on, the street car company at last decided to advance your wages and cut dividends. Then stockholders would become dissatisfied and sell their stock.

As far as these stockholders are concerned, we will not say much. In fact, we will only remark that there isn't a stock in the city that is as widely distributed as this; and that many and many a woman, servant girls, and that many and many a young man has put little savings into this stock—you can buy a share for $57—instead of putting them into a savings bank or building association. To be forced to seek another investment would be rough on them. But it might not be as rough as to have their dividends reduced.

But we are not concerned just now as much about them as we are about you—you 1,700 or 1,800 men.

Suppose quite a large number of these stockholders, and some of them big ones, should come to the conclusion that an investment yielding three or four per cent was not quite as good as they ought to have, in view of the higher prices which they had to pay for everything, and that they could do better to get out.

They could sell at some price. A market can always be found for street railroad stock, and when the price got down low enough to be attractive to men of large capital the stock would be bought.

Now, what we want to ask is, what assurance have you that the new owners of the stock might not conclude that wages paid you were too high and dividends paid them too low, and order a reduction of wages, and after a time an advance in dividends?

"Read the Electrical Review."

[*From the Morning Advertiser, New York.*]

Whoever believes that a trade journal can not be of interest to the general public should read the ELECTRICAL REVIEW, which has just completed its 28th volume. Besides containing some of the best technical work ever done by a trade paper, it constantly prints valuable and exclusive articles from such masters as Edison, Tesla and Professors Roentgen and Salvioni. It has now taken up the subject of vacuum-tube lighting, which promises to give "diffused daylight" even cheaper than the free sunlight itself. The ELECTRICAL REVIEW is notably written from a popular standpoint.

Beginning with 1889, *Scribner's Magazine* has annually published a fiction number that has been remarkable for the number of famous stories that have first made their appearance in it. The August issue of this year will fully sustain this reputation. There will be six short stories, a comedietta, and several popular illustrated articles.

Wordingham's Pillar Distributor.

Most engineers are agreed that it is desirable to inter-connect a distributing network at as many points as possible, mainly in order to equalize the pressure, says London *Lightning*. If this inter-connection is well carried out, it further enables smaller feeders to deal with the constantly shifting area of maximum demand. The great drawback to such inter-connection is the difficulty of localizing a fault should one occur, and, with a view to providing for this, it is essential that all linking points should be capable of rapid disconnection. This is by no means easy to provide for in a neat and convenient manner when there are many cables meeting in one point—say where four streets meet—and the difficulty is very largely increased when the distribution is effected on the five-wire system. The necessity for some convenient highly insulated apparatus for the purpose named, led Mr. C. H. Wordingham, chief engineer to the Manchester Corporation electric works, to devise that illustrated herewith, to which he has given the name of "pillar distributor."

A central hollow cast-iron column standing on three oil insulators is fixed in the junction box. From this column project, at five different levels, three iron lugs 120 degrees apart, cast in one with the column. Five cast-iron plates, each having three slots separated from one another by 120 degrees, and three recesses on the under side, placed between the slots, are provided. One of these plates is slipped over the pillar, the slots allowing it to pass the lugs until the bottom three lugs are reached. The plate is then turned through an angle till the recesses are opposite the lugs, and is dropped down and takes a firm seat; on it are placed two flat rubber rings, which serve as a bed for a porcelain insulator, of the form shown, large enough to slip past the cast-iron lugs. Three slate wedges covered with india rubber strip are placed between the insulator and the pillar, so that the former is firmly fixed. A substantial ring of gun metal is next placed on the insulator, and is prevented from slipping about by means of four small brass pieces secured by bolts and rendered adjustable by means of slots, studs, and tapped holes, which admit of a large number of lugs into which cables are sweated, being affixed to the ring by means of nuts and bolts. A second cast-iron plate is now slid down the pillar and fixed on the next three lugs from the bottom, and an insulator and ring placed on it as before described. Three more cast-iron plates, each with its insulator and ring, are then fixed on the remaining lugs. A large funnel is placed on the top of the pillar, serving to collect any water that may drip into the junction box, and so to prevent it from falling on the apparatus; the water runs down the funnel through the interior of the column. The illustration shows the apparatus complete, without any cables attached.

Such a pillar distributor is capable of dealing with a very large number of cables. Each ring can readily have six half-square inch cables and six smaller ones attached to it—that is to say, the pillar, as a whole, will deal with 70 cables.

A considerable number of these distributors have been introduced into the Manchester network with the most marked success—indeed, they are being placed at all important points of intersection. It is quite easy to disconnect the five cables which pass down a street in as many minutes, and in case of a fault, portions of the network from which a large supply is being taken can be broken with perfect safety. On one occasion, a current of 1,700 amperes, at 200 volts, was successfully disconnected on one pillar.

W. T. Glover & Company, of Salford and London, have the sole right of manufacture. Samples are shown at their works, and at their offices, 39 Victoria street, Westminster.

WORDINGHAM'S PILLAR DISTRIBUTOR.

Beacon Lamp Company Will Move to New Brunswick, N. J.

The Beacon Lamp Company, of Boston, expect to occupy a new factory at New Brunswick, N. J., about September 1. The building is of brick, 200 by 100 feet, two and one-half stories high. The company's business has increased to such an extent that its present quarters in Boston are entirely too small. Among the reasons which led the Beacon Lamp Company to decide on New Brunswick as a location for their new factory were that the shipping facilities there are excellent and it is convenient to New York, from which the Beacon company's large and growing export trade is conducted.

A Denver Lighting Plant Burned.

The two-story brick building of the Denver, Colo., Consolidated Electric Light Company, at Twenty-first and Wynkoop streets, was destroyed by fire on July 12. The building contained 16 Westinghouse engines. The total loss is $130,000; insured for $120,000.

Charles T. Heath, division superintendent of the Lynn & Boston Street Railway, has resigned to become superintendent of the Wakefield & Reading road, after 20 years' service. John F. Brackett will probably be his successor.

Should College Professors Take Out Patents?

TO THE EDITOR OF ELECTRICAL REVIEW:

The above heading to an editorial in the ELECTRICAL REVIEW for June 17 is a timely subject for discussion, and should provoke such comment as to more clearly define the relation of the college professor of science to the industrial world.

Since the editorial challenges individual opinions, the writer offers his convictions that a college professor violates no rule in the sensible code of "professional ethics," nor does he in any way compromise his scientific spirit and devotion, does he take out a patent. On the other hand, should his patent indicate sound mechanical judgment and thorough mastery of the principles involved, it should only increase the esteem in which he is held by his fellow workers. It is one of the most hopeful signs that the barriers of the old scholasticism are so rapidly disappearing, and that much of false sentiment and exclusiveness on the one side, and depreciation on the other, are being given over.

This subject naturally suggests the discussion of a related question: Are college professors likely to become inventors? The popular conception of an inventor is to a great extent erroneous. An invention usually is not so much something "found out" as a combination of well ascertained factors, and consequently does not imply on the part of the inventor a wide range of knowledge of scientific and mechanical principles. Those familiar with the development of the steam engine know how little *direct* aid thermo-dynamics has afforded the designers and patentees of our commercially successful engines. A thorough knowledge of mathematical physics rather prevents than incites its possessor towards invention. While it is entirely permissible that the college professor become a patentee, the fact remains that as a class they have not been, nor are likely to become, inventors. The trend of their work and thought is away from this.

The analysis of the usual inventions show they tend the rather towards the commercial than intrinsic values. The successful inventor must be essentially "a man of affairs"; must produce a device which not only shall work, but be capable of cheap manufacture and use by even stupid people. The execution rather than the idea involved makes the success of an invention.

The attitude of the professor is that of the investigator and critic. If fortunate enough to discover something radically new, then the opportunity presents itself to formulate it in patents. As a critic of existing devices, it would seem that many improvements would suggest themselves and he be incited to patent them.

That the ideas of many important improvements do actually suggest themselves, there is abundant proof. In brief, the scientific facts and ideas involved in most patents owe their origin to the college professor.

Another reason that the professor does not take out patents is that a patent is evolved by tedious and expensive processes, and professors generally do not have either the mechanical appliances or financial aids to successfully materialize their ideas. The time element is also another consideration. The routine work of the college professor practically prohibits the consecutive devotion to the mechanical development of his ideas. So it has occurred that the few patents taken out by college professors have related chiefly to measuring apparatus, since this can be developed naturally in their own laboratories. If the time should come that the leisure and resources of the college professor permit it, he certainly will figure largely in our patent lists, and applied science will be greatly benefited. The reason that so large a percentage of patents issued are either worthless or faulty is that the average inventor is so greatly lacking in scientific and mathematical knowledge.

W. M. STINE.

Armour Institute of Technology, Chicago, July 8.

Rapid News Service to Boston.

[*From the Boston News Bureau.*]

Many people have asked the *Boston News Bureau* by what means it is able to keep Boston not only abreast of New York, but very many times ahead of New York, on important news announcements, such as the opening of the bond bids at Washington in February and more recently the St. Louis and Chicago conventions.

In response we can only say that we have always endeavored to use the best. For Washington service our thanks are due to the Long-Distance Telephone Company, which furnished the *Boston News Bureau* a specially prepared through telephone connection.

For the St. Louis and Chicago conventions the Postal Telegraph Company's lines direct to the Convention Hall were immeasurably superior to everything else; in fact, so long a circuit as from St. Louis to Boston was worked by Postal wire from Convention Hall to the *Boston News Bureau* office without a break or relay, an unusual feat in telegraphy, and only possible with the best wires.

But the *Boston News Bureau* rule is, "Always the best," and for cable and telegraph this means, wherever available, a Postal wire.

We may be pardoned, perhaps, in this instance for deviation from our usual course if we remark that, as the *Boston News Bureau*, with its press facilities and typesetting machinery, was the only financial news bureau in either New York or Boston to publish the complete Democratic platform as presented by the sub-committee Wednesday morning, Boston bankers enjoyed prompt financial news that day ahead of their New York brethren.

It is reported that over $12,000 was raised in a single day for the proposed electric road between Flint and Fenton, Mich. Work will soon begin.

ELECTRICAL REVIEW

Times Building, 41 Park Row,
P. O. Box 2339. NEW YORK.

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REGISTERED CABLE ADDRESS:
"ELECTVIEW," NEW YORK.

1546 "CORTLANDT," TELEPHONE CALL.

SUBSCRIPTION TO THE
ELECTRICAL REVIEW.

One Year, United States and Canada, - $3.00
One Year, Foreign Countries, - - 5.00
Single Copy, - - - - - - - .10

Copies can only be supplied for one year back at 25 cents each.

SPECIAL NOTICE TO ADVERTISERS.

***CHANGES** for advertisements must be in this office by Friday noon for the following week's issue.*

***NEW ADVERTISEMENTS** should be in the office not later than Saturday noon to insure publication the following week.*

NEW YORK, JULY 22, 1896.

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Our neighbor, the *Safety Valve*, makes the following sage editorial utterance:

The manufacturers of the United States need not feel disturbed at the apparent course of events politically. The right must and will prevail.

This position is a straddle to be proud of. The free silverites believe they are right and will prevail. Does our contemporary think so?

A MANUFACTURER'S THOUGHTS ON THE POLITICAL SITUATION.

The following communication was written by a gentleman possessed of large manufacturing interests and who takes an intelligent and thoughtful interest in politics. He is a personal friend of President Cleveland's, and has been a Democrat for 35 years. His views on the sound currency and tariff questions should prove interesting and instructive to electrical manufacturers.

TO THE EDITOR OF ELECTRICAL REVIEW:

We are confronted now by a condition in national politics fraught with so much danger not only to our national credit, but to the very life of our government, that every honest patriot, regardless of race, creed, religion or politics, revolts at the principles enunciated by one of the great political parties of the country. The people seem to have been taken unawares. The crazy talk of the free coinage of silver was thought to be so silly, and so barren of any logic or argument to commend it to honest thinking men, that no real danger was seriously thought of until a lot of socialistic-populistic demagogues were able to seize upon the old Democratic party and prostitute it to anarchism and revolution. Now, however, the deed having been done, the people are awake and alive to the threatened danger. In 1861 the patriot could shoulder his musket and go to the front to help maintain the nation's honor and integrity; his interests and willingness now to defend its honor are just as great and just as necessary, and his first duty is, without prejudice, and without thought of party or aught else to save his nation's honor and credit; to do, with great earnestness, whatever he can to catch and kill the dragon of silver before it attains a growth sufficient to blot the escutcheon of this proud and honest nation.

Great mistakes are sometimes made by the greatest of men, and the one great mistake of this decade was made by President Cleveland when, near the close of his first administration, he sent to Congress his famous tariff message. No one who knows Mr. Cleveland will doubt his sincerity or honesty of purpose as expressed in that document, but the bad policy of its utterance and the baneful influences which have followed it can not but now be apparent to all. When that message was promulgated the treasury was overflowing; the business of the country was most flourishing. Mr. Cleveland's administration had been wise and clean. No public issues of any prominence existed, and, in my judgment, Mr. Cleveland should have sought in a quieter way to have had the tariff modified by sections, so that it would have met the expenses of government and not unduly taxed the people. Rather than to have issued that message as he did, and make tariff the great issue of the then coming Presidential campaign; to have simply stood on his good record and clean administration, he would have been surer of a re-election, and the country would not have been disturbed. The Republicans, of course, hailed the message with great joy, for it made an issue. The great leaders of the Republican party did not believe in a high protective tariff any more than honest Democrats did, but the Democratic party was in power, with all the prestige that meant. There was nothing else to talk about—nothing to particularly recommend the Republican party as against the party in power—so with high glee they took the opposite side and preached the false doctrine of a *high protective* tariff with such force and persistence that on that issue alone they were enabled to elect Mr. Harrison. Then, of course, to keep their faith with the people, they were obliged to inaugurate a great tariff change, and the result was the McKinley bill.

All this continuous agitation of a subject so important to business and commerce caused a perfect paralyzation of business, which had not regulated or quieted itself when another Presidential campaign came along, and, on the same old issue, the people reversed their former judgment and again elected Mr. Cleveland, which, in the natural course of things, resulted in the enactment of the Wilson tariff law, getting the country back somewhat upon the same basis it was before Mr. Cleveland's first unfortunate tariff message. But, meantime, for more than eight years business has been prostrated and the people kept in such a condition of uncertainty and unrest that now the rank and file of both parties, having suffered so much, are unwilling to have tariff continued as a disturbing issue in this campaign—silver is bad enough. All intelligent and honest citizens have a common and unscrupulous enemy to fight, and all alike now look to the wise and good behavior of McKinley in the position he occupies, as the only candidate standing upon an honest money platform, to avert the threatened calamity foretold by the principles enunciated by Wm. J. Bryan and backed up by Altgeldism, Tillmanism, populism, and all the mockery of honor and credit. No party, community or set of men in this country ask for the continued agitation of the tariff question; it is not an issue, and no part of the country will permit its representative in the coming Congress to do more than simply to, in a quiet way, adjust the tariff so as to meet the *necessary* expenses of government, which, of course, must be done by whatever party may be in power. So the agitation of a high protective tariff again by Mr. McKinley would not only be unwise, but cruel and even criminal. He wants every vote he can get to be elected, and to ostracise the very large Democratic vote he would otherwise secure, by a continued demand for a high protective tariff, would not only be unwise and impolitic on his part, but extremely dangerous to the credit and welfare of the nation. The fungus, but controlling, part of the Democratic party has made the free coinage of silver and a revolution in all the honest purposes of government, the only issue; so let us fight it out on that line, and after the wolves have been crushed and killed, we can, at another time, take up any question or issue that may look to be for the good of the people. MANUFACTURER.

New York, July 17.

THE FINANCIAL SIDE.

Stocks suffered heavy declines this week owing to a scare on the part of investors that was caused by fears of a raid on the treasury gold reserve that stands as a guarantee for the fiat greenbacks of the government. There was more or less foundation for this apprehension, as capitalists have already begun on a small scale to withdraw gold, either in the form of metal or through purchases of exchange. The silver scare, of course, is at the bottom of the trouble. Three months must elapse before the election takes place, and in the interim the reserve, which is now only about $93,000,000, will undoubtedly need bolstering up. Heretofore an issue of bonds has been made whenever propping up has been necessary. Under present conditions it is very doubtful if an issue of bonds could be sold advantageously, and even if offered, would be likely to arouse such a storm of indignation among the masses as to materially strengthen the canvass of Bryan.

The average decline in stocks this week, up to midday on Thursday, was about 5 per cent. In the latter days there was a sharp rally of a speculative character. The outlook for stocks and bonds is by no means promising, and no materially higher level of prices is anticipated until the vexed gold question reaches a settlement. Business in all quarters is hung up owing to uncertainties. However, it is on bed-rock, and bankers in no instance show any apprehension regarding the outlook.

As might be imagined, the course of electrical securities was downward, in sympathy with the general market. Liquidation which occurred throughout the list was particularly noticeable in high-priced inactive securities, owing to the peremptory selling orders and an almost total absence of a market. In view of these facts, a three-point decline in a stable security like Edison Electric Illuminating of New York that occurred is not to be wondered at. In a like degree the drop of some 5 points from high in Western Union, landing it at 77¼, commanded only passing attention. Both of these stocks had a sharp rally on Friday. Various electric bonds sold off in sympathy with the downward movement in the stock market. General Electric, on account of its speculative character, was very prominent in the decline, losing 6¾ points, recovering 3, and later reacting 1½. The low point on Thursday was 20, which is just exactly 19¾ points below the high of the day following the announcement of the contract between that company and Westinghouse. If reports are to be credited, and there is no reason why they should not be, this contract has saved a great deal of money to the two companies, and is destined to do better in the future. In fact, the earnings of the General Electric Company in June improved some $204,000 over the corresponding period in 1895. In view of these facts, it would seem that the price of the stock is very low, and that there will be a sharp rally, with an improvement in conditions.

There is a great deal going on beneath the surface in New York traction affairs, and special activity is just now reported from the Metropolitan Traction Company's camp. I am told that an announcement is forthcoming involving consolidations that will prove an agreeable surprise to the traveling public. The latest proposition of Manhattan to the Rapid Transit Commission is to construct trolley lines connecting with the northern terminals of the elevated. The absurdity of this, from the rapid transit point of view, is at once apparent. The well informed say that it is nothing more or less than a move to gain time. The fact of the matter is that the elevated people desire franchises which were offered them by the commission, but they do not care to enter into a contract until after the election. In the meantime they may be expected to adopt one subterfuge after the other to delay matters. In the interim the earnings of the company may be expected to steadily decrease, leaving the management the option of reducing dividends or meeting them with borrowed money.

The earnings of the Edison Electric Company of Brooklyn for June show an increase in net of $14,070, and in amounts applicable to dividends of $8,870, as compared with June, 1895. For six months the net increase was $76,956, and the increase in the amount applicable to dividends $63,665.

The Southern Electric Light Company has declared a dividend of 3 per cent, payable June 16.

The net earnings of the Edison Electric Illuminating Company of New York for June were $67,412, a decrease as compared with the previous June of $5,861. The net for six months were $544,532, an increase of $53,530. BAIN.

New York, July 18.

PERSONAL.

Mr. Henry C. Payne, the well known street railway man of Milwaukee, Wis , has been appointed a member of the Executive Committee of the Republican National Committee.

Prof. D. E. Hughes, of England, has been awarded the Albert Medal of the Society of Arts for the services he has rendered to arts, manufacture, and commerce, by his numerous investigations in electricity and magnetism, especially the printing telegraph and microphone.

Among the passengers on the "Augusta Victoria," which sailed for Hamburg last Thursday, were Mr. A. S. Hibbard, general manager of the Chicago Telephone Company, and Mrs. Hibbard. Another distinguished passenger was Mr. John I. Sabin, the well known telephone man of San Francisco.

Death of John N. Gamewell.

John N. Gamewell, inventor of the electric fire-alarm system bearing his name, died at Hackensack, N. J., last Sunday morning of heart disease. He was born in Marlborough, N. C., 74 years ago.

NORTHWESTERN ELECTRICAL ASSOCIATION.

(Continued from page 39.)

session was the reading of Mr. C. C. Paige's paper on "Insurance." Mr. Wheeler asked whether an underwriter's expert had been visiting towns in Wisconsin and placing the electric wiring in the different cities under the ban of the underwriter's rule. Mr. Paige replied that an inspector had been at Oshkosh and he did not know of a single job in that city the inspector had not condemned. He stated that electrical service had been in operation in Oshkosh for 11 years,and not a single fire had occurred during that time. It was supposed that good wiring had been done there until the inspector arrived. Mr. Wheeler wanted to know if any loss in business had been experienced in Oshkosh, owing to the result of the inspector's work,and whether the insurance companies had canceled any policies upon condemned buildings. Mr. Paige replied that in the majority of cases new wiring and other work had been put in under the conditions advised by the inspector. Several customers had discontinued the service. Mr. Cuno said that the worst trouble he had to contend with regarding insurance rules was the constant change in rules.

Mr. Doherty read a report of the special committee to consider the recommendations in the president's address. At the conclusion of the report Mr. Doherty said :

"In addition, the committee wish to include in the report the recommendation that the Committee on Municipal and Opposition Ownership shall make it their duty to collect facts and figures on the subject of municipal lighting, that will be beneficial to the central station man who has a fight on hand, or trouble of that sort." A motion was made and seconded that the report be adopted.

A motion was made, seconded and carried by a rising vote that the thanks of the association be tendered to the Entertainment Committee and through them to the people of Marinette and Menominee for the courteous hospitality which had been extended to the members of the association during the convention.

The following gentlemen were elected to membership in the association :

J. H. McGill, occupation, agent electrical supplies; residence, Chicago; recommended by Messrs. Low and Mercein.

W. S. Donnelly, occupation, electrician ; residence, Chicago ; recommended by W. W. Low and Irving P. Lord.

H. F. Pierce, occupation, manufacturer, Negaunee, Michigan; recommended by Mr. A. C. Bunce and Mr. T. R. Mercein.

A motion by Mr. Hanley, to the effect that the president appoint a committee to solicit new members, was seconded and carried unanimously. The meeting then adjourned until 9 o'clock, July 17.

FRIDAY, JULY 17.

The convention was called to order by the president at 9 o'clock A. M., July 17, in the court house. The president announced that he had appointed the following committee to solicit new members : Mr. Burch, of Madison ; Mr. Wilson, of Milwaukee ; Mr. Latimer, of Chicago ; Mr. Anderson, of Franklin, Ohio ; Mr. McGill, of Chicago ; Mr. Kittman, of Chicago ; Mr. A. C. Bunce, of Milwaukee ; Mr. J. M. Hill, of Chicago ; Mr. Christie, of the Dearborn Drug and Chemical Company; address, Racine.

Mr. Doherty made a motion, which was unanimously carried, that the name of the Legislative Committee be changed to Protection Committee.

Secretary Mercein moved that Mr. E. C. Eastman, of Marinette, be elected an honorary member of the association. The motion was seconded and unanimously carried. Mr. Eastman contributed $5 to the fund for the payment of the indebtedness heretofore referred to.

It was moved, seconded and unanimously carried that the secretary be instructed to issue the usual 500 reports, and that he be authorized to pay all just bills and accounts as presented to him. The convention then adjourned.

THE ATTENDANCE.

The following members of the Northwestern Electrical Association answered the roll call at Marinette, Wis., on July 15 :

Active Members—Baker, W. A., Waupaca, Wis.; Baker, A. O., Sheboygan, Wis.; Bragg, W. P., Monroe, Wis.; Bunce, A. C., Milwaukee, Wis.; Burch, Loren W., Madison, Wis.; Cuno, Chas., Oconomowoc, Wis.; Daniell, Ed, Menominee, Mich.; DeLand, Fred, Chicago, Ill.; Hanley, G. W., Marinette, Wis.; Harding, J. H., La Porte, Ind.; Higgins, H. C., Marinette, Wis.; Kerns, L. E., Madison, Wis.; Korst, P. H., Racine, Wis.; Kountz, R. F., Neillsville, Wis.; Lord, I. P., Waupaca, Wis.; Mercein, T. R., Milwaukee, Wis.; McLaren, G. S., Milwaukee, Wis.; Mullen, E. G., Milwaukee, Wis.; Paige, C. C., Oshkosh, Wis.; Wheeler, G. B., Eau Claire, Wis.; Williams, O. B., Whitewater, Wis.

Associate Members—Baker, C. O., Chicago, Ill.; Boyer, F. N., Chicago, Ill.; Latimer, H. D., Chicago, Ill.; Low, W. W., Chicago, Ill.; Whyte, Geo., Chicago, Ill.; Wilson, Chas. E., Chicago, Ill.; Wolff, James, Chicago, Ill.

Corporation Members — Crause-Tremain Carbon Company, Fostoria, Ohio; DePere Electric Light and Power Company, DePere, Wis.

OBITUARY.

Walter O. Lewis, who built the original telegraph line from New York city to Sandy Hook, and did much to develop the system of ship news gathering now in vogue, died in Germantown, Philadelphia, on July 15. He was about 82 years old. He was one of the early advocates of the feasibility of the Atlantic cable and was a warm friend of Cyrus W. Field. His ship news service he brought to a condition of high efficiency. It is now owned by the United Press.

New York State Railroad Commission Reports On a Trolley Accident.

The New York State Railroad Commission has rendered its decision and findings regarding the accident which happened to an open car on the Thirty-ninth street hill track, operated by the Nassau Electric Railroad Company, in Brooklyn, N. Y. The accident, which was reported in the ELECTRICAL REVIEW at the time, occurred on Sunday afternoon, June 7, when the trolley pole of the car became detached from the wire, and the car backed down the hill. One passenger was instantly killed, and another died in the hospital several days after the accident. In addition to these fatalities, a number of passengers were more or less injured. There were 133 persons on the car, many of them standing on the side steps. The commission's decision is, in part, as follows:

"While the immediate cause of this accident was the trolley wheel leaving the wire, the board is of the opinion that the primary cause was the overcrowded condition of the car, whereby the conductor was prevented from reaching the rear platform in order to replace the trolley wheel or assist the motorman in applying the brakes. The officers of the company claimed that the motorman did not first apply the hand brake, but tried to stop the car by using the motors, and that while making this attempt he reversed the power, thus adding to the speed of the car in its descent of the hill, and thereby contributing to the accident.

"The board finds that the evidence does not substantiate the claim. On the contrary, all the evidence adduced at the inquest goes to show that as soon as the trolley wheel left the wire the motorman applied the hand brake, as he should have done, and that for some reason unexplained, unless on account of overloading, the brake did not hold the car. The motorman then endeavored to stop the car with the motors, and at some point on the way down the hill—the precise point the board is unable to determine—he did reverse the power, but such act in no way contributed to the accident.

"The board has repeatedly recommended that passengers be prohibited from riding on the front platform of any electric or cable car, and, in granting permission to operate by electricity or cable, this condition has been made a part of the order of the board. This recommendation was made with the knowledge that on some open cars there is a seat on each end facing the end of the car, and that the prohibition would keep passengers from occupying this seat on the front platform.

"Since then, however, larger cars have been constructed, with more space on the platforms, and if the number allowed on the front platform of an open car is limited to the number that can be comfortably seated, say five, on the cars of the Nassau line, the motorman would not be interfered with. The board, therefore, modifies its previous recommendation to this extent, recommending that not more than five persons be allowed on the front platform of the large open cars of the Nassau company, or of any other company operating cars similar in size and construction; that these persons be required to be seated, and that, when the limit is reached, the motorman be instructed to close both gates of the front platform.

"This is not intended as any modification of the previous recommendation of the board, so far as closed cars are concerned.

"It is further recommended that on all lines of electric or cable railroads in this State, passengers be absolutely prohibited from riding on the running boards or side steps of open cars, and that cars be not allowed to proceed so long as persons are standing upon either of these steps and refuse to get off the car or stand in one of the aisles.

"The board approves the Brooklyn city ordinance, designed to prevent the overcrowding of cars, which prohibits 'any car from carrying a greater number of passengers than half as many more than can be seated,' provided this number can be carried without crowding the front platform beyond the limit above specified, or permitting persons to stand on the running boards or side steps, and recommends that when overcrowding is attempted by the public, the conductor be directed to refuse to proceed until the load is reduced to the lawful number, invoking police assistance, if necessary, to enforce the law.

"All cars operated on a grade of five per cent or more should be equipped with an auxiliary brake, or with some appliance which may be used by the conductor or motorman in stopping the car. A simple device used by the Albany Railway Company on the State street hill in the city of Albany, where the grade is even greater than on Thirty-ninth street, Brooklyn, is a so-called dog attached to a chain running up through the rear platform of the car, by which it is held up when not in use. This is always dropped by the conductor before ascending the hill, and materially aids in holding the car when a stop is made. The board recommends that this or some similar device be placed on all electric cars in the State used upon streets where the grade is more than five per cent, and also calls the attention of street railroad managers to the new auxiliary brake on the new cars of the Third avenue cable line in New York city.

"Steam railroads equipped with air brakes still retain the old hand brake, to be used in case of emergency. It is much more important that electric and cable cars operated upon heavy grades have duplicate brake equipment, even in addition to the electric appliances, which seem to require men of more skill to manipulate than are usually employed.

"The board further recommends that when ascending grades of five per cent or more, conductors be directed to remain on the rear platform, prepared to protect the trolley pole or assist in applying the brakes in case of emergency.

"The board also recommends that the brakes and trolley pole apparatus on all electric cars be carefully examined after each round trip, and censures Inspector Hardin of the Nassau company for not having made a thorough examination of car 719 when Motorman White reported it in bad condition. The rule in force on railroads of this State, where safety in operation is the first consideration, is to immediately return cars to the car house for inspection and repair when reported in bad condition by a conductor or motorman.

"It is ordered that these recommendations, so far as applicable, be directed to all of the electric and cable railroad corporations of this State."

FIG. 1.—PANORAMIC VIEW OF A PORTION OF THE WESTERN TELEPHONE CONSTRUCTION COMPANY'S FACTORY IN CHICAGO.

Corsets and Electrical Instruments.

In the electrical department of a girls' high school in a suburb of San Francisco the professor in charge has for some time been sorely perplexed and distressed, says a daily paper. His delicate testing instruments would play him all manner of tricks, and experiments which he had always made with the certainty of a specific result would turn out in a most inexplicable way. These curious phenomena were exhibited only when certain of the students approached the galvanometer. The professor discovered that the disturbance was caused by the wearing of corsets with ribs of steel; the instruments were entirely unaffected by the proximity of the students who wore health waists or webbing braced with whalebone or other substitutes for steel. The position was a delicate one, and the professor became strategic. He took counsel with two of the women teachers, who lectured the girls on hygiene and physical development and warned them of the evils of corsets. But the real motive of the crusade leaked out, and many of the girls found plenty of excuses for declining to make the sacrifice suggested. Finally the professor was obliged to issue a rule forbidding girls wearing corsets from entering the electrical laboratory, and the governors indorsed the rule. Some of the girls, who thought that they could surely succeed in gaining admittance to the laboratory in spite of the edict, reckoned without the professor, and were promptly turned back. At the entrance to the department was placed a sensitive galvanometer, alongside of which the professor stood unobtrusively. On the approach of a girl wearing steel-ribbed corsets the needle gyrated frantically, and the wearer was respectfully but firmly reminded of the rule. It was impossible to "beat the game," and expostulations were useless.

LITERARY.

Mr. R. H. Derrah, of the West End Street Railway Company, Boston, has issued a little book which fills a long-felt public want. It is entitled "A Street Railway Guide for Eastern Massachusetts." A map and alphabetical index show how to reach, by street railway, the leading cities and towns of eastern Massachusetts, from Boston to Brockton, South Framingham, Lowell, Lawrence, Haverhill, Newburyport, Gloucester, and Salem. Besides this, the guide gives a complete directory of the West End Street Railway Company's system, showing where to take a car for any point in Boston or suburbs. It further gives time tables, fares, routes, connections and mileage of all lines in the territory named. The relation of the steam roads to the street railways is also shown on the map. The price of the book is 10 cents, and it can be obtained at all the hotels and news stands in Boston or vicinity, or will be sent, postage free, on receipt of price, by the ELECTRICAL REVIEW, Times Building, New York city.

The Peninsular Electric Light Company, of Detroit, Mich., has filed a renewal of the mortgage on its plant for $600,000.

WESTERN TELEPHONE CONSTRUCTION COMPANY.

VIEWS OF ITS BUSY FACTORY IN CLINTON STREET, CHICAGO.

The Western Telephone Construction Company, of Chicago, report that their business so far this year has been over five times as great as it was up to this time last year. The prosperity of this company has been steadily increasing as the company has grown older, and, from present indications, their already well equipped factory will have to be greatly enlarged before much time elapses. We show herewith several illustrations of their factory and apparatus.

Fig. 1 is a panoramic view of one side portion of their factory, the central portion being the telephone assembling department.

Fig. 2 shows a corner of the switchboard department. In the foreground are shown several of the 100-drop switchboards. To one familiar with telephone switchboards in general, the extreme compactness of this apparatus is at once a striking feature.

Fig. 3 illustrates one of these 100-drop switchboards mounted on a table with plugs and cords and everything complete.

Fig. 4 shows three of the 100-drop sections incorporated into a large exchange. This illustration shows a 300-section of a 2,000-subscriber exchange.

The problems involved in large exchange work have been met by this company in an entirely new and original manner. Their large exchange board is a radical departure from anything heretofore placed on the market. The number of motions required to connect any two subscribers have been reduced to a minimum.

One of the great beauties of this system is that it may be added to *ad libitum* without any remodeling of the apparatus already existing. This is an advantage which will at once appeal to any telephone man.

In Fig. 5 is shown the power generator put out by this company. The driving pulley is connected to the armature shaft by a flexible connection, so that the wear on all the bearings is greatly reduced and the liability of the armature to get out of alignment is reduced to a minimum. This generator is mounted on a heavy block of slate.

It has always been the policy of this company to protect its apparatus against infringement. It enters into contracts with its patrons to assume the expense of any suit brought against them, and has always lived up to the letter of these contracts, and it is claimed that there has yet to be a case where the user of the Western Telephone Construction Company's apparatus has suffered on account of patent suits. The policy of this company has been an honest and progressive one throughout. Its growth has been phenomenal, and it would be difficult to predict to what degree of prosperity it will attain in the near future.

FIG. 2.—A CORNER IN THE WESTERN TELEPHONE CONSTRUCTION COMPANY'S SWITCHBOARD DEPARTMENT, CHICAGO.

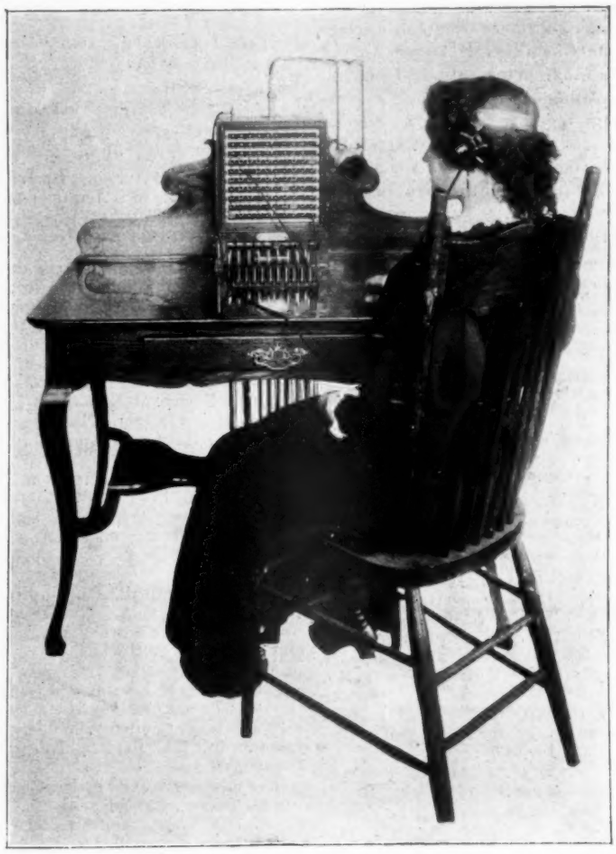

FIG. 3.—WESTERN TELEPHONE CONSTRUCTION COMPANY'S 100-DROP SWITCHBOARD.

FIG. 4.—THREE OF THE WESTERN TELEPHONE CONSTRUCTION COMPANY'S 100-DROP SWITCHBOARDS, FORMING PART OF A 2,000-SUBSCRIBER EXCHANGE.

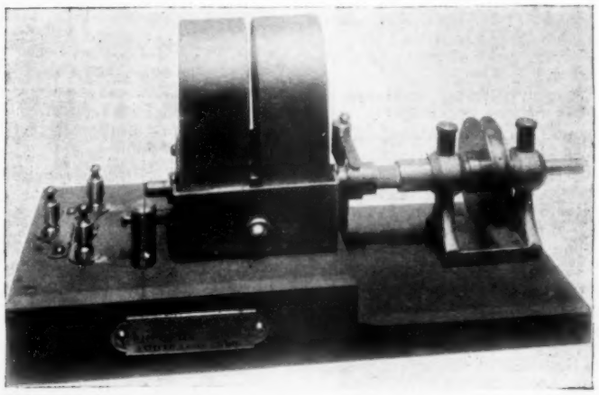

FIG. 5.—WESTERN TELEPHONE CONSTRUCTION COMPANY'S POWER GENERATOR.

It is said that an electric light plant in the West, which is not definitely located, is using flax straw successfully for fuel. The straw costs one dollar a ton, and two tons of it are said to be equivalent to one ton of the best coal. It can be burned in ordinary coal grates.

REMINISCENCES OF THE ELECTRICAL EXHIBITION.

REPORTS OF THE TELEGRAPH AND CABLE COMPANIES ON THE LONG-DISTANCE MESSAGES—THE GOLDEN TELEGRAPH KEY.

The Western Union Telegraph Company and the Postal Telegraph Cable Company and the Commercial Cable Company have filed their official reports of the transmission of the historic long-distance telegraph message of Dr. Chauncey M. Depew around the world from the National Electrical Exposition on May 16. These reports, together with the original messages in the handwriting of Dr. Depew and Edward D. Adams, will be filed at the Smithsonian Institute in Washington, together with all of the telegraphic instruments used upon that occasion. The transcription of the messages by Thomas A. Edison, acting as the receiving operator, will also be placed in the Institute. The reports are as follows:

WESTERN UNION TELEGRAPH COMPANY,
Eastern Division,
CHAS. A. TINKER, General Superintendent,
NEW YORK, May 26, 1896.

F. W. HAWLEY, Esq., Chairman Committee of Arrangements, National Electrical Exposition, New York city.

DEAR SIR: Complying with your request, I have respectfully to submit the following report of the Western Union Telegraph Company's service in the transmission of the message of Mr. Chauncey M. Depew to Mr. Edward D. Adams, and Mr. Adams's reply thereto, from the Electrical Exposition, on the evening of Saturday, May 16, 1896:

Preparatory to transmission, the circuit was made up from the Exposition building to the following points, at which automatic repeaters were introduced, viz.: Pittsburgh, Pa.; Chicago, Ill.; Omaha, Neb.; Cheyenne, Wyo.; Ogden, Utah; Reno, Nev.; San Francisco, Cal.; Los Angeles, Cal.; Flagstaff, Ariz.; Pueblo, Colo.; Kansas City, Mo.; Chicago, Ill.; St. Louis, Mo.; Little Rock, Ark., to Galveston, Tex.; distance, 7,397 miles of wire; 14 sets of repeaters.

At the Exposition building, the gold key used by President Cleveland in opening the World's Fair at Chicago in 1893 was placed in circuit.

The messages (copies hereto attached) were handed to me (the operator) by messenger from Mr. Depew at 8.38 o'clock, and instantly put upon the wire in direct communication with Galveston, where they were received by Colonel L. C. Baker, superintendent, the transmission occupying six minutes by the official timekeeper's (Mr. Abbot) record. From Galveston it was transmitted to Buenos Ayres via Mexican Telegraph Company and Central & South American Telegraph Company (including land lines across the continent of South America and over the Andes from Valparaiso to Buenos Ayres), 6,272 miles; via River Plate Telegraph Company, Buenos Ayres to Montevideo, 114 miles; via Western & Brazilian telegraph lines, Montevideo to Pernambuco, 2,364 miles; via Brazilian sub-marine cables, Pernambuco to Lisbon, 3,663 miles; via Eastern Telegraph Company, Lisbon to Penzance, 899 miles; via Western Union Telegraph Company's Atlantic cables, Penzance to Canso, 2,620 miles, and at 8.59½ the messages were received over the cable wire from Canso, N. S., 1,187 miles (repeaters at St. John, N. B., and Bangor, Me.), and copied upon a typewriter by Operator Geo. W. Dickson, and delivered to Mr. Depew. The two messages contained 68 words, and were transmitted from the Exposition building, New York, over a total distance by land lines and cables of 24,516 miles, and received back at the Exposition building in 21½ minutes. Respectfully,

CHAS. A. TINKER.

POSTAL TELEGRAPH-CABLE COMPANY,
WILLIAM S. BAKER, Vice-President.
Executive Office, 253 Broadway,
NEW YORK, June 1, 1896.

F. W. HAWLEY, ESQ., Chairman Committee of Arrangements, National Electrical Exposition, Grand Central Palace, New York.

DEAR SIR: In compliance with your request, we submit the following report of the service performed by the Postal Telegraph-Cable Company and the Commercial Cable Company, in connection with the messages transmitted from and to the National Electrical Exposition Hall, in the Grand Central Palace, New York, on Saturday evening, May 16, 1896.

The circuit was made up from New York to San Francisco by way of Buffalo, Chicago, St. Louis, Kansas City, Albuquerque, and Los Angeles, a distance of 4,118 miles, as the lines run.

A second circuit was made up from San Francisco to Canso, Novia Scotia, by way of Vancouver, Winnipeg, and Montreal, a distance of 4,914 miles.

From Canso to London and return, the message was handled by the Commercial Cable Company, and east of London by the Eastern Telegraph Company.

The message, signed by Dr. Chauncey M. Depew, and addressed to Mr. Edward D. Adams, and Mr. Adams's reply thereto, were handed to us at 8.34 o'clock, when they were transmitted direct to San Francisco and thence repeated by "human relay" to the Commercial Cable Company's office at Canso, where they were repeated by "human relays" through Waterville, London, Waterville, Canso, and No. 1 Broad street, New York; from which office they began to be received back at the Exposition Hall at 8.38 o'clock, having been exactly four (4) minutes in traveling 15,518 miles of land line and cables.

The exact distances, as the lines go, were as follows:

From New York to San Francisco,	4,118	miles.
" San Francisco to Canso,	4,914	"
" Canso to London,	2,823	"
" London to New York,	3,663	"
	15,518	

When the message reached London, a copy was handed to the Eastern Telegraph Company, which company transmitted it from London to Land's End,

London	to Porthcurno, Land's End,	250	miles.
Land's End	" Lisbon,	856	"
Lisbon	" Gibraltar,	336	"
Gibraltar	" Malta,	1,126	"
Malta	" Alexandria,	913	"
Alexandria	" Suez,	154	"
Suez	" Aden,	1,403	"
Aden	" Bombay	1,850	"
Bombay	" Madras, about	500	"
Madras	" Penang,	1,497	"
Penang	" Singapore,	398	"
Singapore	" Saigon	630	"
Saigon	" Hong Kong,	991	"
Hong Kong	" Fooshoow,	473	"
Fooshoow	" Shanghai,	459	"
Shanghai	" Nagaski,	1,241	"
Nagaski	" Tokio, about	600	"
		13 677	miles,

and back by the same route to London, whence it was forwarded via Canso and the Commercial Cable Company's office, No. 1 Broad street, to the Exposition Hall, having occupied 47½ minutes in traversing a circuit 42,872 miles in total length.

Colonel Albert B. Chandler acted as the sending operator, and Mr. Thomas A. Edison as the receiving operator, in the Exposition Hall.

Yours truly,

Postal Telegraph-Cable Company,
By W. H. BAKER, Vice-President.

Commercial Cable Company.
By GEO. CLAPPERTON, Traffic Supt.

The messages transmitted were as follows:

NEW YORK, May 16.

To EDWARD D. ADAMS.

God created, nature treasures, and science utilizes electrical power for the grandeur of nations and the peace of the world.

(Signed) CHAUNCEY M. DEPEW.

To CHAUNCEY M. DEPEW.

Mighty Niagara, nature's wonder, serving man through the world's electric circuit, proclaims to all peoples science triumphant and the benevolent Creator.

(Signed) EDWARD D. ADAMS.

NATIONAL ELECTRICAL EXPOSITION COMPANY,
Industrial Building, New York city,
NEW YORK, July 10, 1896.

The E. S. GREELEY & Co., 5 and 7 Dey street, New York city.

GENTLEMEN: The management of the Exposition Company direct me to extend to you their high appreciation and sincere thanks for the loan of the gold key, used by President Cleveland in opening the World's Fair at Chicago in 1893, for use at the Exposition building on Saturday evening, May 16, 1896, in transmitting the message from Dr. Chauncey M. Depew to Edward D. Adams, via the following route:

The messages were handed to the operator at 8.38 o'clock, and were instantly put upon the wire in direct communication with Galveston, via Pittsburgh, Pa.; Chicago, Ill.; Omaha, Neb.; Cheyenne, Wyo.; Ogden, Utah; Reno, Nev.; San Francisco, Cal.; Los Angeles, Cal.; Flagstaff, Ariz.; Pueblo, Colo.; Kansas City, Mo.; Chicago, Ill.; St. Louis, Mo.; Little Rock, Ark., to Galveston, Texas; distance, 7,397 miles of wire; 14 sets automatic repeaters. From Galveston it was transmitted to Buenos Ayres via Mexican Telegraph Company and Central & South American Telegraph Company (including land lines across the continent of South America and over the Andes from Valparaiso to Buenos Ayres), 6,272 miles; via River Plate Telegraph Company, Buenos Ayres to Montevideo, 114 miles; via Western & Brazilian Telegraph lines, Montevideo to Pernambuco, 2,364 miles; via Brazilian submarine cables, Pernambuco to Lisbon, 3,663 miles; via Eastern Telegraph Company, Lisbon to Penzance, 899 miles; via Western Union Telegraph Company's Atlantic cables, Penzance to Canso, 2,620 miles, and at 8.59½ the messages were received over the cable wire from Canso, N. S., 1,187 miles (repeaters at St. John, N. B., and Bangor, Me.), and copied upon a typewriter and delivered to Mr. Depew. The two messages contained 68 words and were transmitted from the Exposition building, New York, over a total distance by land lines and cables of 24,516 miles, and received back at the Exposition building in 21½ minutes.

Very truly yours,
(Signed) C. O. BAKER, Jr., President.
(Signed) GEO. F. PORTER, Secretary.

ELECTRIC RAILWAY NOTES.

A party including the superintendents of the New England steam roads inspected the third-rail system on the Consolidated's Nantasket electric line last week.

The Street Railway Commissioners have authorized the Rockport, Mass., Street Railway Company to issue $100,000 capital stock for the construction of a road in Rockport to connect with Gloucester.

It is reported that the Brooklyn Elevated Railroad Company, of Brooklyn, New York, is thinking of using electricity as a motive power. It is said that General Manager Barton has sent an engineer to Chicago to report on the third-rail system there in use.

The New London, Ct., Street Railway Company has elected the following officers: Walter Learned, of New London; W. A. Tucker, of Boston; Winthrop A. Coffin, of Boston; John A. Coffin, of Boston; John F. Perry, of Boston; Tracy Waller, of New London, and H. C. Learned, of New London.

A mysterious attempt to blow up the power house of the Portsmouth, Ohio, Electric Railroad Company was made on the night of July 2. A glass jar containing a stick of dynamite was placed in a window and exploded by means of a fuse. No damage was done beyond the destruction of the window. The police are investigating the case.

The foreclosure sale of the South Side Elevated Railroad, of Chicago, otherwise known as the Alley "L," will take place on Wednesday, September 15. It is ordered under a decree of Judge Hanecy, and will place the owners of the road in a position for immediate action as to a change of motive power and consideration of plans for extension and terminals.

A Chicago dispatch says that negotiations are under way between Asa Potter, representing the Love Traction Company, and representatives of the Chicago City Railway, for the purchase of the General Electric Railway ordinance. The Love Traction Company paid $150,000 for the ordinance and wants $250,000. Should the Chicago City Railway purchase, it would close all avenues to future competing lines.

On July 15 the lease of the New York & Harlem Railroad Company by the Metropolitan Street Railroad Company was ratified at a special stockholders' meeting. The road will hereafter be known as the Fourth Avenue Division of the Metropolitan Street Railway System. As already announced in the ELECTRICAL REVIEW, the lease is for 999 years from July 1, last, at an annual rental, exclusive of all taxes, of $350,000, equivalent to three and one-half on the capital stock of the New York & Harlem Railroad Company for the first five years, and of $400,000, equivalent to four per cent on such capital thereafter.

BRIDGES FOR ELECTRIC RAILROADS.

BY CHAS. F. STOWELL, C. E., IN THE "RAILROAD GAZETTE."

In the old day of horse cars, almost any bridge that would carry ordinary wagon loads would answer for the street railroad. The advent of electric cars, with their greatly increased loads and higher speed, rendered a general overhauling of bridges obviously necessary, but this work does not seem always to have received the attention which its importance demanded. Bridge accidents on trolley roads are beginning to be reported, and it is to be feared that the owners of such roads will have to be taught in the hard school of experience before they become convinced that the cheapest is not always, in the long run, the most economical construction.

It took steam railroads many years to realize that it did not pay to try to skimp on their bridges, but, with unimportant exceptions, they have all learned it, and now the rule is, at least on roads of any size, to have the bridge periodically examined by trained men; to have their own designs for new structures made by their own experts, either permanently employed or temporarily retained, and to have their work executed under rigid specifications and with close inspection over every portion, from the manufacture of the material to the finished structure. Railroad companies have found that this method of procedure pays not only in the matter of better and safer bridges, to say nothing of getting the full worth of the money they lay out, but, in the event of any possible accident on a bridge, it is found to be a very comfortable thing to be able to demonstrate its exact condition by sources and from testimony entirely independent both of the company itself and of the contractors.

How many trolley companies have done or are doing this? The usual method of obtaining a bridge on a trolley line is either to place the whole thing in the hands of some favored contractor, trusting to his skill and sense of honor to do what is right, or, worse, to get up a general battue of bridge agents, each one making his own plans and specifications, and letting the contract to the one who offers to cover the opening for the least money, after the fashion of ordinary highway bridge lettings, and subject to the accompanying evils of pools, poor designs, bad work, and rotten steel. The man who would advertise for a horse five feet high and eight feet long, letting the seller fill in the rest of the requirements, would be looked upon as crazy. But this is precisely in line with what highway commissioners and trolley roads are doing every day, only in their case the result is liable to be more disastrous and costly.

The consequences of this state of affairs are beginning to show themselves in the trolley accidents which happen. Within the last six months the following have been reported:

On January 9, last, the new iron bridge over Tinker's Creek, on the Akron, Bedford & Cleveland road, broke down, killing two men and injuring another. The circumstances have been fully published in the *Railroad Gazette*, and ought to be equally humiliating both to the contractors who built and the company which used the bridge.

On April 7, a new iron bridge over the Clinton River, on the Rapid Railroad Company's line, at Mt. Clemens, Mich. (a suburb of Detroit), fell with its load, carrying down five men, all of whom fortunately escaped with light injuries. A newspaper report states that "the owners of the bridge have never felt any fears as to the safety of the structure, as it was constructed by a firm of well-known builders, whose very name was a guarantee." But it appears that something more than the reputation of the builder is necessary to hold up a bridge.

On May 26 occurred the disastrous Point Ellice bridge failure at Victoria, B. C., by which 43 lives were lost. It has been generally reported in the engineering press that the cause of this accident was the breaking of a weak and rotten wooden floor beam, but the coroner's jury which investigated it found the cause of the accident to be the breaking of an iron hanger. The jury further says that "the design was poor, the system of construction obsolete, and the contract was not carried out according to the specifications by the contractor. . . . We find that the specifications call for weldless iron, but that the ironwork is in almost all cases welded and in many cases of inferior quality, and that the factor of safety provided for in the specifications is an unknown quantity."

On June 14, a stone bridge at Muskegon, Mich., fell, but the cars which were crossing succeeded in reaching solid ground, and no one was injured.

Every one of these accidents might have been prevented by the exercise of as much prudence as a man would naturally use in buying a horse if he knew nothing about horses. We shall see how many more cases will be recorded within the next six months.

In ordering a bridge for trolley use the officials of the road are quite likely to underestimate the loads which it will have to carry. I have known them repeatedly to give as the weight of cars the lightest, or at most the average weight, not thinking, apparently, that it is the heaviest car in use, or the heaviest that may be used at some future time, that is likely to do the mischief. For the load on a car it is common to estimate the seating capacity of a car, though it is notorious that cars with a seating capacity of 25 to 50 are frequently packed with 100 to 150 passengers. In steam railroad work it is common practice to make certain allowances for impact, but in the case of trolley roads this is not generally done, though the necessity for it is the greater. Such bridges are often located in a "hole" between two grades where fast running is natural and where speeds of 25 or 30 miles per hour are not unusual. Moreover, the pitching or "teetering," so often noticeable on trolley cars, is something unknown on steam cars, and is especially severe on the floor system, throwing, as it does, excessive loads alternately on each axle in rapid succession. But very often it is not the regular, or even occasional, heavy trolley loads which cause trouble, but the adventitious loads to which almost any road is liable, but which are rarely allowed for. Some roads carry freight, the weight of which should be the governing factor in determining the capacity of the bridges, while a great many run an occasional carload of coal, either for their own or other's use. It was such a load that wrecked the Tinker's Creek bridge, and the Clinton River bridge broke down under three carloads of ballast pushed by a motor. A loaded coal car frequently weighs 88,000 pounds, or 11 tons on each axle, and this is the kind of load which is likely to wreck a good many more trolley bridges before the record is closed.

The quality of the material of which a bridge is built is usually one of the least of the considerations, because it is the one that the purchaser knows least about. It is generally left entirely to the builder, whose object is to make all he can out of the contract, and who, naturally, uses whatever material can be obtained cheapest. Many people delude themselves with the idea that the quality of their steel is of little importance, provided they only get in enough of it. A large amount of poor steel may delay a catastrophe, but will not prevent it. We hear some engineers asserting that as long as steel pulls, bends, elongates, and reduces well, that is everything necessary, and all the rest may be safely left to the manufacturer. It would be equally consistent to say to a contractor: "I want a bridge which will carry 50 tons. Build it any way you please and out of anything that comes handy, only load it once with 100 tons, and if it does not break down I will take it." They do not realize that out of a lot of 15,000 to 20,000 pounds, one sample weighing two or three pounds, selected, prepared and tested by the manufacturer himself, whose every interest is to have the test come out exactly as he wishes, may possibly not be a fair exemplar of the whole lot; or, even if it is, that steel of which a small piece has done certain things once, in a laboratory test, may not, in large quantities and under the actual conditions of use, continue to do the same thing indefinitely.

To get good and safe bridges for trolley use requires only that one obtain good designs, good material and good workmanship. And the difference in cost between this and poor designs, scant sections, bad work and rotten material is very slight.

TELEPHONE NEWS AND COMMENT.

A Syracuse, N. Y., paper says that the Western Telephone Construction Company will establish a branch office in Syracuse as a headquarters from which to handle its New York State business.

President S. M. Bryan, of the Chesapeake & Potomac Telephone Company, and Judge Jere M. Wilson, recently had a hearing before the Commissioners at Washington, D. C., upon a matter which concerns all the electrical companies in the city maintaining overhead wires, and also the people who are interested in seeing these wires put under ground. In brief, Judge Wilson and President Bryan want the Commissioners to decide whether or not an electrical company can take down an existing wire in one part of the city and put it up in another part. The law of 1888, prohibiting the erection of "additional" overhead wires, is brought forward by the company, which makes the fine point that it is not stringing "additional wires" to transfer a wire. Of course, the wire they wish to "transfer in every case is out of use."

Mayor Hooper, of Baltimore, on July 1 signed the ordinance authorizing the Home Telephone Company to lay its wires and cables in unused conduits of the police and fire-alarm telegraph subway system, and to erect poles for temporary use in sections of the city to which the subway system does not yet extend. It is understood that the Home company will at once file the necessary bond of $10,000, required by the ordinance, and proceed with the construction of its lines, having made preliminary preparations for the work. Under the ordinance the company is required to pay the city as rental seven cents a year for every linear foot of duct occupied by its lines. This rental must be paid semi-annually. Should the company be in arrears for three months, the Mayor is authorized to have the lines removed at the company's expense. Within two years the company is required to have no less than 2,000 telephones in actual service. These it must furnish to offices at $4 a month, while the rental for those in dwellings must not exceed $3 a month.

Underground Work in Boston.

Commissioner of Wires Flood, of Boston, is making rapid progress in his work of building subways and getting the wires in Boston under ground. Up to July 11 he reports that there have been 5,951 feet of trench opened, 75,005 feet of conduit laid, 354,076 feet of ducts put in, 204 manholes built, 428 service connections made from the mains of the different companies, and 17,155 ducts and 29 manholes in connection therewith; of cable, 147,899 feet have been drawn in.

ADVANCE INFORMATION

Valuable News and Tips for Manufacturers and Dealers.

We publish below information relating to new electric railways, new electric light companies, new telephone companies and projected electric construction of all kinds. Every reader will find these columns of special interest, and manufacturers and supply houses will receive many valuable suggestions looking to new business by carefully watching this department in the ELECTRICAL REVIEW.

New Electric Railways.

WAKEFIELD, MASS.—The North Woburn, Winchester & Medford horse railway, Woodward Shaw syndicate, which owns a controlling interest in the company, will change that line to an electric road.

NORTH ADAMS, MASS.—The electric road is to be extended to the Beaver. It may also go to Briggsville.

BALTIMORE, MD.—The East Baltimore & Clifton Park Railroad Company has been incorporated by Nelson Perin, Geo. C. Jenkins and William P. Harvey, to build electric railways.

CHATTANOOGA, TENN.—T. J. Nichol is interested in the proposed construction of a $300,000 electric railway to Signal Mountain.

AURORA, ILL.—The Aurora & Geneva Railway Company has been incorporated to build an electric railway in Kane County, Ill. Capital stock, $10,000.

SIOUX FALLS, S. D.—The Sioux Falls Transportation Company has been incorporated by Chas. F. Smith, Boston, Mass.; F. H. Files, Chas. O. Bailey, Harold E. Judge, Sioux Falls; to build an electric railway. Capital stock, $50,000.

FREDERICK, MD.—The Frederick & Middletown Electric Railway board of directors have reconsidered their route in Frederick and established a new one.

BALTIMORE, MD.—The Baltimore, Catonsville & Ellicott's Mills Passenger Railway Company executed trust mortgage for $500,000 to the Safe Deposit and Trust Company, of Baltimore.

STANDISH, MICH.—An electric railroad will be constructed from Standish to Point Lookout.

CHARLESTOWN, N. H.—An electric road, to cost $175,000, is to be constructed from Springfield to Charlestown.

DERRY, N. H.—The Derry & Chester electric road will erect two car houses 100x30 feet, one on Highland avenue, near Hendy's mill, Derry, and the other in Chester. Two 500-horse-power engines will be put in.

KNIGHTVILLE, ME.—The tracks for the electric road are being rapidly built.

CONWAY, MASS.—The directors of the Conway electric road will extend their road.

WORCESTER, MASS.—Asa L. Kneeland is interested in proposed construction of a new electric railway from this city to Westminster.

HARTFORD, CT.—Philadelphia capitalists are interested in a scheme to build an electric road between this place and Springfield. The route proposed is by way of Agawam and Suffield.

STAMFORD, CT.—The electric road will be extended three miles, and contracts have already been awarded.

SCRANTON, PA.—The B. F. Shaw Company has received the contract for refitting the power house of the Scranton Traction Company with steam heating and power apparatus. The Scranton company's buildings are being enlarged.

EAST LIVERPOOL, OHIO—A new electric street railway is to be constructed, and surveys are now being made. It is hoped to have the railway completed by October 15.

BUFFALO, N. Y.—The Buffalo Railway Company, of which Henry M. Watson is president, has been granted permission to extend its electric railway.

CLARKSVILLE, TENN.—The Clarksville National Bank is reported as having agreed to furnish the necessary capital for constructing an electric railway.

CHICAGO, ILL.—The Chicago City Railway Company will erect an electric power plant, for which R. J. Hill, C. E., 2022 State street, has made the plans.

BOSTON, MASS.—Boston and western Massachusetts capital is interested in an electric road which is to be built from Worcester to Mt. Wachusett. It will be one of the longest suburban roads in the country. It is contemplated connecting Fitchburg, Gardner and other important cities and towns. The Fitchburg & Gardner road, for which a charter was granted by last legislature, will be built this Fall. One of the branches of the project outlined above is to lay out a park of 1,000 acres on Wachusett and to erect a hotel and pavilion. If legislative approval is secured, the company will supply the towns through which it passes with electricity for lighting purposes.

SACRAMENTO, CAL.—The Sacramento Electric, Gas and Railway Company recently incorporated. All the property and interests of the Folsom Water Power Company, also all the property and interests of the Sacramento Electric Power and Light Company, have been conveyed to the first mentioned company. The ownership remains the same, but there will now be but one company.

BEAMSVILLE, ONT.—The Hamilton, Grimsby & Beamsville electric railway, it is reported, is to be extended from Grimsby to Beamsville.

BENTON HARBOR, MICH.—The St. Joseph & Benton Harbor Electric Railway Company has been granted franchises for a railway two miles long.

Electric Light and Power.

VALDOSTA, GA.—The Valdosta Electric Light Company, of which S. W. Bentley is manager, has been reorganized and will increase the size of its plant, adding new machinery, etc. Capital stock, $20,000.

AMITE CITY, LA.—J. L. Harris, J. A. Cathran and others are interested in the establishment of an electric light plant.

RISING SUN, MD.—Coates & Fox contemplate the establishment of an electric light plant.

MEMPHIS, TENN.—The Electrical Engineering and Supply Company is installing an electric light plant in the Peabody hotel.

PHILLIPSBURG, N. J.—Phillipsburg Electric Lighting, Heating and Power Company has been incorporated by Jacob B. Smith, E. D. Pursell, Wm. H. Reaser, Geo. L. Shillinger, Phillipsburg; Albert E. Swartz, Wm. A. Heller, Allentown, Pa. Capital stock, $25,000.

ATHENS, GA.—The electric lighting system has been extended.

LISTOWELL, CAN.—Louis Bolton, Town Clerk, can give information concerning the construction of an electric light plant.

STOCKTON, N. J.—An electric light plant is to be constructed. City Clerk may give information concerning same.

AMERICUS, GA.—The Mayor will give information concerning the construction of an electric light plant.

GEORGETOWN, S. C.—E. E. Mendeville, of Racine, Wis., has been awarded contract for erecting electric light plant at Georgetown, for lighting the streets, and work will be commenced immediately.

FOSTON, MINN.—Ten thousand dollars' worth of bonds will be issued to erect an electric light plant and waterworks.

EAST MCKEESPORT, PA.—East McKeesport Light Company has been incorporated by W. D. Reeper. Capital stock, $1,000.

EDWARDSVILLE, ILL.—The Edwards Electric Light and Power Company has increased its capital stock for extending its plant.

ROLLA, MO.—Steps are being taken to establish an electric light plant.

SUNCOOK, N. H.—The Garvins Falls Power Company closed a contract last night to light this village with electricity for five years.

ASBURY PARK, N. J.—Atlantic Coast Electric Light Company has been incorporated, to operate along the Monmouth Coast; capital stock, $500,000. John E. Comins, Arlington; Arthur D. Chandler, Orange; John B. Summerfield, Brooklyn, stockholders.

BROOKLYN, N. Y.—The Philadelphia Storage Battery Company has signed a contract to light the Brooklyn Navy Yard.

BELLEVILLE, ILL.—The city has contracted with the Electric Light and Power Company for the electric lighting of the city for the next two years at $80 per lamp per annum.

READING, PA.—The probabilities are that in a very short time this city will be illuminated with electricity generated by water power.

New Telephone and Telegraph Companies.

ANSONIA, CT.—The American Telephone Company has been organized with a capital of $1,000. The subscribers are C. D. Warner, V. Munger, and Dana Bartholomew.

ALBANY, N. Y.—The United States and Hayti Telegraph and Cable Company has been incorporated with a capital of $1,800,000, the route and points to be connected to be as follows: From New York city to Coney Island, thence by submarine cable to the island of Hayti, in the West Indies, and from New York city, through the States of Connecticut, Rhode Island and Massachusetts to Boston. The directors are John W. Mackay, George Clapperton, Albert Beck, John Beattie and Charles E. Merritt, of New York city; Albert B. Chandler and Edward C. Platt, of Brooklyn.

MT. VERNON, N. Y.—The local long-distance telephone company will hereafter be known as the New York Telephone Company instead of the Westchester Telephone Company. It has, with the Metropolitan Telephone and Telegraph Company, become consolidated with the New York Telephone Company. The Yonkers office will be done away with.

New Manufacturing Companies.

SAN ANTONIO, TEX.—The Dubinski Electric Company has been incorporated by Benjamin Dubinski, Thos. Dewees, and John A. Green, Sr., for the manufacture of electrical machinery and electrical supplies, and machinery, and for the purchase and sale of such goods. Capital stock, $10,000.

HUNTERSVILLE, W. VA.—Pocahontas Electric Company has been incorporated by James S. Laing, Freeman C. Bartlett, Harry Hirshfield, New York, and others. Capital stock, $200,000.

ATLANTIC HIGHLANDS, N. J.—The E. B. Cutten Electrical and Manufacturing Company has been incorporated; capital stock, $30,000. Chas. T. Leonard, R. S. Snyder and others are interested.

Increase of Capital.

BROCKTON, MASS.—The Brockton Street Railway Company has increased its capital stock $110,000 to build the North Easton street railway and to improve its power station on Ames street.

ST. LOUIS, MO.—The Skeen Electric Switch and Signal Company has filed articles to increase its capital stock from $5,000 to $10,000.

ELGIN, ILL.—The Crown Electrical Manufacturing Company has increased its capital stock from $25,000 to $45,000.

Business Troubles.

NEW YORK, N. Y.—The Ongley Electric Company, judgment for $3,733. Henry Hardon, assignee.

KINDRED INTERESTS

Goldmark & Wallace, 27 Chambers street, New York, have just issued a dainty folder describing and illustrating the Koch dynamo brush.

The Metropolitan Electric Company, 186 and 188 Fifth avenue, Chicago, is marketing an extensive line of rigid and expanding wire guards for incandescent lamps.

In spite of the unusually cool Summer, the sale of Lundell fan motors by the Interior Conduit and Insulating Company has been more than double that of any preceding year.

The factory of the Phillips Insulated Wire Company, at Pawtucket, R. I., has been running for the past few months practically to the capacity of production for the standard lines of weatherproof wire.

A new line of metal fixtures and line specialties, including screw pins and bolt pins, window and cornice hooks of various patterns for use with different sizes of glass insulators, break-arms and branch-arms, are to be introduced to the electrical construction field by L. S. Beardsley, of Naugatuck, Ct.

The Electric Storage Battery Company, of Philadelphia, has recently closed contracts for chloride accumulator plants to light the New York Custom House, Ford's Theater, in Washington, which is government property, the Military Academy at West Point and several other government buildings.

J. C. Vetter & Company, 104 East Twenty-third street, New York, have perfected a combined tapping plug and lamp socket. It is claimed to be the simplest device for tapping and carrying current from any electric system to motors, drop-lights and other electrical devices without the loss of lamp in fixture.

The Electric Appliance Company, of Chicago, report that their Armorite interior conduit is meeting with a rapid sale. The great advantage in being able to bend the conduit, and thus avoid the use of regular and special elbows, is very much appreciated by the trade. The saving in time required for installing is also a point that is not overlooked.

The Sessions Foundry Company is the name of a newly incorporated company which will conduct the business heretofore carried on at Bristol, Ct., as a co-partnership by John H. and Wm. E. Sessions, under the name of Sessions Foundry Company. The officers of the new company are John H. Sessions, president; Wm. E. Sessions, general manager and treasurer, and Wm. T. Shepard, secretary.

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ELECTRICAL PATENTS

563,972 Trolley; C. E. Powell, Bryn Mawr, Pa.—Consists of a frame and standards, a guide, a truss rod and post and a plate resting upon said post and carrying the trolley.

562,980 Cut-out for electric circuits; G. W. Scovil, Elgin, Ill.

563,016 Electrode for galvanic belts; E. S. Collicott, London—Consists of two or more reticulated plates of aluminum, the said plates being connected by wires to the two poles of a pocket electric battery.

563,025 Electric signaling apparatus; M. Du Perow, Washington, D. C.—A magneto-generator, an electric motor, connecting driving mechanism, a broken circuit through the local battery of the telephone and a switch for closing said circuit, with telephone signaling and speaking circuits.

562,032 Electric heater; W. S. Hadaway, New York—Consists of a radiating surface and an electrical conductor in the form of a graduated helix disposed in spiral form upon said radiating surface, but insulated therefrom.

563,052 Electric program clock; D. Ogden, Columbus, Ind.

563,073 Apparatus for telephone switchboards; C. E. Scribner, Chicago, Ill.

563,084 Telephone system; J. G. Smith, New York.

563,094 Electric railway; J. Tatam, Philadelphia, Pa.—A slotted conduit, a conductor therein, an insulating lining within the conduit and insulating blocks for supporting the conductor therein, said blocks having inclined approaches for lifting the current collector.

563,127 Galvanic battery; E. S. Boynton, Brooklyn, N. Y.

563,138 Double-acting thermostat; H. Cortland, Toledo, Ohio.

563,144 Process of extracting copper from ores; J. Douglas, New York—Consists in suspending solid cuprous chloride of copper in electrolyte, inserting the cathode into the solid cuprous chloride and the anode into the electrolyte, and passing a current there through.

563,149 Telegraphy; S. V. Essick, Yonkers, N. Y.

563,244 Electric railway trolley system; W. C. Keithley, San Francisco, Cal.

563,245 Telephone switchboard system; C. E. Scribner, Chicago, Ill.—A telephone line, a local storage battery in the line circuit at the sub-station, a source of charging current at the central station, a relay controlling the connection of the said source of current with the line, a local circuit including the electro-magnet of the relay, and switch contacts adapted to complete the local circuit in establishing connection with the line.

ISSUED JULY 7, 1896.

563,250 Multiple switchboard for telephone exchanges; O. A. Bell, Brooklyn—A spring jack having two line springs, a test spring in front of the presented ends of said line springs and insulated from them, and an extra contact piece insulated from both the said line springs and the test springs, and the test ring adapted to be crossed with said test ring by the insertion of the plug into the jack.

563,254 Electric railway; H. Brandenburg, Chicago, Ill.—A conduit formed with the integral upwardly extending webs, a slot rail secured to one of said webs and a co-operating slot rail hinged to the other web, and having a recessed seat for the edge of the web whereby the conduit may be readily opened.

563,257 Lightning arrester and automatic fuse block; T. L. Carleton, New Orleans, La.

563,269 Combined annunciator and fire alarm; M. Garl, Akron, Ohio.

563,273 Means for insulating electric conductors; T. Guilleaume, Germany—A naked electric conductor, a tabular envelope of non-conducting material, angular in cross section and twisted, so as to present in its internal surface spiral prominences with which the conductor is alone in contact.

563,274 Electric cable; T. Guilleaume, Germany—A conductor, a grated or ground vegetable, or other fiber or bark suitable for insulating, surrounding the said conductor, and a braiding or tubular covering inclosing the said insulating material.

563,282 Electric railway; E. Lachmann, Germany.

563,288 Electrical production of chemical reactions; W. Lobach, Chicago—Consists in producing an electrical discharge between two electrodes, passing oxygen or an oxygen product between the electrodes to produce oxygen in the nascent state, and passing the oil between said electrodes and into contact with the oxygen while in the nascent state.

563,290 Method of automatic current regulation of dynamo-electric machines; F. H. Loveridge, Coldwater, Mich.

563,294 Apparatus for selective signal systems; F. R. McBerty, Downer's Grove, Ill.

563,304 Electrically controlled boat-steering apparatus. C. E. Ongley, New York—A rudder, a cable, and means for moving it, means for connecting the cable and rudder, and a magnet in a suitable circuit normally holding said means out of engagement with the rudder.

563 315 Electric arc lamp; C. E. Scribner, Chicago.

563,316 Speed regulator for dynamos; C. E. Scribner, Chicago—A responsive controller for a dynamo-electric machine, a pulley belted to the armature shaft for driving said machine, a driven shaft upon which said pulley is mounted, a speed-varying engagement mechanism between said pulley and said driven shaft, said engagement mechanism being connected with the responsive controller, whereby the speed of the armature is regulated to maintain a practically uniform current strength.

563,317 Speed regulator for dynamos; C. E. Scribner, Chicago.

563,318 Bridging bells; C. E. Scribner, Chicago, Ill.

563,319 Incandescent lamp; C. E. Scribner, Chicago, Ill.—An exhausted bulb of glass, a film of carbon or other refractory conducting material deposited upon the inner surface of the bulb and leading-in wires sealed into the bulb, making electrical connection with the film.

563,320 Multiple switchboard system for telephone exchanges; C. E. Scribner, Chicago, Ill.—The core of an electro-magnet, the magnetizing helix thereof, an additional normally open-circuited coil encircling the same core and means for closing the circuit of said additional coil in short circuit.

563,321 Incandescent lamp; C. E. Scribner, Chicago, Ill.

563,322 Telephone circuit; C.E. Scribner, Chicago, Ill.

563,323 Testing apparatus for multiple switchboard; C. E. Scribner, Chicago, Ill.—A balanced metallic circuit telephone line, a testing plug connected with one side thereof, a ground branch including resistance from the same side of the line and a telephone bridged between the sides of the line from a point between the ground branch and the test plug.

563,324 Electric police signal system; C. E. Scribner, Chicago, Ill.

563,325 System of current distribution for sub-station telephones; C. E. Scribner, Chicago, Ill.—An electric circuit, including serially a telephone transmitter and telephone receiver at different stations, a condenser in the circuit intermediate of the two stations, a source of electric current and an impedance coil in a parallel or shunt circuit with the condenser, whereby current is supplied in the telephone circuit for operating the telephone transmitter.

563,326 Contact point for electrical instruments; C. E. Scribner, Chicago, Ill.

563,327 Telephone exchange switchboard; C. E. Scribner, Chicago, Ill.—A switchboard table provided with separately removable plug sockets arranged along the longitudinal center of the board and the spring-jack switches placed on opposite sides of said sockets.

563,333 Spring jack for telephone switchboards; H. B. Thayer, New York.

563,395 Circuit re-establishing cut-out; A. L. Tucker, Chicago, Ill.

563,336 Electric signaling apparatus; F. W. Turner, Newton, Mass.

563,337 Brush for arc dynamos; H. H. Wait, Chicago, Ill.—A main brush, an independently fed auxiliary brush, situated at the tip or leaving edge of the main brush.

563,352 Individual calling apparatus; W. W. Alexander, Kansas City, Mo.

563,395 Telephone transmitter; W. A. Moore, Brooklyn, N. Y.

563,425 Power gearing for electric cars; E. A. Sperry, Cleveland, Ohio.

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